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The Importance of Zinc

in Textile Technology

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THE average text-book of chemistry has very little to say on the subject of the appilcations of metals and their salts in the textile industry. Writers of theoretical treatises have rather a different end in view from textile technologists and so concentrate their attention on a study of the properties of substances from the theoretical standpoint. One learns a lot by doing, however, and the practical specialist in the course of his work finds out a number of curious phenomena that he can put to good advantage which an academic observer would ignore on account of their having no theoretical significance.

Readers of a journal such as this, however, will agree that there is something to be learned on both sides. Many interesting facts come to light in the pursuance of orthodox research that receive little or no attention from practical men and, at the same time, practical research papers contain discoveries which the theoretical specialist might do well to study, but frequently does not.

Previous articles in this series, "The Importance of Iron in Textile Technology," and the following one on Copper aimed at coordinating these two influences, and it is now proposed to discuss the practical applications of zinc and its salts in a similar manner.

Certain uses of zinc in dyeing are well known, as for instance, the zinc-lime vat which was formerly employed in the dyeing of indigo.

Calcium hydroxide (lime) reacts with powdered zinc and Calcium Zincate CaO.ZnO is produced and, at the same time, hydrogen is formed which reduces the dye to the leuco form and this dissolves in the excess of lime employed. For 1 pound of indigo paste (20 per cent), 5 pounds of quicklime are required and 2 ounces of powdered zinc, the latter being made into a paste with the indigo and then diluted with milk of lime. The mixture is stirred and maintained at about 140 deg. F.

Another mode of employing zinc for reducing vat colors is to combine it with sulfurous acid when hydrogen is obtained and zinc hydrosulfite $Zn_2S_2O_4$ produced. Nowadays, it is not usual for dyers to make their own reducing chemicals, but zinc hydrosulfite and similar zinc products are still much used for stripping dyes from fabrics. Zinc hydrosulfite requires an addition of acid to make it effective on account of its comparatively high stability.

Zinc chloride was at one time extensively used in the finishing processes, sometimes on a solubilizer and preservative for starch preparations, and also as a deliquescent in filling mixtures. Between 5 and 6 per cent of zinc chloride on the weight of starch is necessary to ensure freedom from mould and fungi, though changes have taken place in choice of preservative, recently, and the new compound "Shirlan" is said to be 30 times more effective than zinc chloride. Its application to cotton as a deliquescent is limited by its acid nature, as there is liability to induce tendering. Although zinc chloride is apparently a neutral salt, its reaction is distinctly acid because of a tendency to hydrolyze in aqueous solution with the simultaneous formation of basic zinc chloride and free hydrochloric acid. When it is stated that Messrs. Coward, Wood and Barret (J. Text. Inst., 1933) found that 0.05 per cent of hydrochloric acid dried for 10 minutes at 100 deg. Cent., on a cotton fabric produced measurable tendering, it will be realized how very real this danger is when zinc chloride is applied in any quantity as a cotton dressing.

Zinc and zinc sulfide finds a small field of application in calico printing in the discharge style with hydrosulfite. Its presence in the paste enables a better white background to be obtained.

In weighting silk, zinc has been used, but not to any great extent, as tin weighting is more general.

It will be seen that zinc is not employed as much as formerly and there are definite signs that its use in the dyeing and finishing processes, such as described, may soon be a thing of the past. At the same time, new avenues of utility are being opened up in other and slightly different directions. The patent literature shows a steady increase in the utilization of various compounds of zinc and it is proposed now to discuss some of these items.

One interesting new outlet for zinc oxide is in the rubber finishing of textile fabrics with latex mixtures. Previously, rubber has been confined to such specialized fields as the waterproofing trade, but nowadays, almost all sections of the textile industry are experimenting with rubber in the convenient form of latex. Many finishers have recently been brought face to face with the vulcanization process for the first time as the result of this new trend.

A typical latex formula is as follows:—

130 Revertex.
50 Whiting.
3 Zinc Oxide.
2 Sulfur.
0.2 Anchoracel 2P.
5 Casein solution 10 per cent.
Water—about 15 parts.

The precise mechanism of the vulcanization process is not yet completely understood and so it is not possible to say with certainty what takes place in the mixture when it is heated and hence vulcanized. Zinc oxide is an activator and without it many organic accelerators will not function. One theory is that it prevents the accelerator which is a catalyst being poisoned by acid or sulfuretted hydrogen, both of which are generated to some extent during the heating or drying process.

In larger proportions zinc oxide has a reinforcing and strengthening effect on the resulting vulcanized product. A certain amount is always added in the manufacture of rubber tires to give increased resistance to tearing.

Zinc sulfide has established itself in recent years as a reagent for delustering rayon. It is said that 0.2 per cent zinc sulfide gives a dulling effect double that obtained by 6 per cent of barium chloride. 5 to 10 gram is made into a paste with 2 c.c. of a good emulsifying oil and diluted with soft water to one liter, according to a recent French process. The yarn is treated in the zinc sulfide solution for 30 minutes, hydro-extracted and dried.

According to U. S. Pat. No. 1,756,941 of Dreyfus and Platt, assignors to the Celanese Corporation of U. S. A., zinc sulfide is precipitated within the fiber of cellulose acetate or cellulose acetate-containing fabrics by double impregnation. The material is first treated with a zinc salt in presence of a swelling agent, as for instance, zinc chloride, acetone, formic or acetic acid, and afterwards passed through sodium sulfide solution, then soaped and dried. The precipitated zinc sulfide reduces the luster permanently and gives the fiber affinity for direct cotton dyes. The process is also applicable to partially hydrolyzed silk. Delustering by this method is protected in England by British Celanese under Brit. Pat. No. 344,093.

Zinc oxide is the delustering agent in Brit. Pat. No. 339,603. Fine particles of 0.75 or less of this oxide or other substances of refractive index, different from that of rayon, and not chemically reactive with the materials used in the manufacture of the latter, are dispersed into the mixture of cellulose derivative and solvent, and spun into filaments. The object, here, is to save a process, the subsequent delustering after spinning.

British Celanese claim to produce dull-luster acetate rayon by incorporating 0.5 to 4 per cent finely ground titanium oxide or zinc oxide into the spinning solution of cellulose ester in acetone. (Brit. Pat. No. 341,897.) A more recent patent protects the use of zinc carbonate in gelatinous and flocculent form as an addition to the spinning both together with oil and a dispersing agent in the manufacture of rayon filaments of reduced luster. (Brit. Pat. No. 389,518.) A great many more delustering patents protect the use of zinc compounds among other substances.

Mention of zinc sulfate is made in certain patents relating to the manufacturing process of viscose rayon. The I. G. Farbenindustrie (Brit. Pat. No. 290,231) specify a coagulating bath containing not more than 0.1 per cent of a zinc salt, for example, the sulfate, whereby threads with finely channelled surfaces are formed. This enhances the optical covering power and gives the resulting filament an opaque, silvery appearance. The use of zinc salts in the spinning bath results in a reduction in the time of ripening (Brit. Pat. No. 259,386).

W. F. Richter (U. S. Pat. No. 1,876,754) spins viscose solution into a coagulating bath containing sulfuric acid, bismuth sulfate and zinc sulfate.

Reference was made to cellulose acetate fiber acquiring an affinity for direct cotton dyes by impregnation with zinc sulfide in a previous paragraph. This mordanting action is a matter of considerable interest, both from the practical and the theoretical standpoint. Two patents may be quoted which employ zinc salts for mordanting cellulose acetate filaments. Brit. Pat. No. 309,899 treats the fabric with a zinc salt at low temperature followed by a fixing process with phosphates or silicates. Brit. Pat. No. 306,611 deals with mordanting with sodium zincate assisted by swelling agents. As the result of the process, the cellulose ester material may then be dyed with basic, acid, mordant, direct and vat dyes.

The explanation is probably to be found in the fact that many dyes form insoluble compounds with basic salts of zinc. This does not apply to all, however, and the fact that certain others do not form complexes with metals is made the subject of an ingenious process by Calico Printers Association (Brit. Pat. No. 348,715) for obtaining a decorative treatment of cellulose acetate fabrics. The essence of the process is to print a paste of

zinc acetate and then overprint certain dyes which have an affinity for cellulose acetate and are capable of forming insoluble complexes with such metallic compounds. The material is then steamed and afterwards heated with dilute acids which dissolve away the zinc complex and leave white in those places. Fancy colored effects may be obtained by adding certain dyes to the zinc paste which have an affinity for acetate rayon but do not precipitate complexes with metals.

Zinc chloride acts in a catalytic sense in a process of obtaining two-color reserves by printing. (Bull. Soc. Ind. Mulhouse 1928.) The basis of the process is the fact that during steaming, the formaldehyde compound of napthol reacts with resorcinol in the presence of zinc chloride yielding free napthol capable of coupling with a diazotized amine to give an insoluble azo color. The compound resulting from the condensation of resorcinol and formaldehyde acts as a mordant for basic dyes. A suggestive method of discharge printing is that described in Brit. Pat. No. 341,909 of British Celanese Ltd., and G. H. Ellis. Instead of a paste containing formaldehyde-sulfoxylate dissolved in water, they recommend pastes containing zinc formaldehyde sulfoxylate finely dispersed as being more efficient and having greater stability.

Zinc thiocyanate is proposed as an ingredient of discharge pastes for cellulose acetate according to a recent patent of E. I. du Pont de Nemours and Co. 1933 (Brit. Pat. No. 401,350). The use of this compound, along with diethylene glycol, is claimed to give clear and white discharges and to enable dyes not previously considered dischargeable to be removed satisfactorily. This compound of zinc was found to possess swelling power for acetate rayon as well as ability to assist the reducing action of the formaldehyde sulfoxylate. The substitution of ammonium for zinc thiocyanate was found to be not so effective.

Cellulose acetate is usually weighted with tin salts, but zinc salts may also be included with advantage according to Brit. Pat. No. 309,876, whereby the impregnation may be conducted at lower temperature and the resulting weighted material is found to have less tendency to melt in ironing and to laddering in wear.

Waterproofing compounds are usually fixed by aluminum salts, but Naefl uses sulfonate of zinc (Ger. Pat. No. 314,969). The fabric is padded with a soluble alginate and then treated with zinc which precipitates the alginate in a colloidal form and produces a waterproof finish resistant to a boiling neutral dyebath.

A curious process of "dyeing down" or changing the color of a fabric by partial stripping with zinc and bisulfite deserves mention, if only on account of its novelty. Messrs. Spectrum Dyes Proprietary Ltd. (Brit. Pat. No. 305,922) propose to treat a dyed fabric with a solution obtained by the interaction of sodium bisulfite and zinc and then add another similar solution containing, in addition, the reaction product of coal tar naptha and sulfuric acid. The mixture is heated till the requried color appears.

It is interesting to note that by means of using zinc chloride it is now possible to resist sulfurized phenols (e.g. Katanol) and a printing process has been devised along these lines by Imperial Chemical Industries (Brit. Pat. No. 325,935).

Certain zinc salts are of importance in textile chemical analysis and the most familiar one is zinc-chloriodide which stains cellulose blue and so is used for the identification of cotton hairs. To make up the solution dissolve 5 grams of potassium iodide in 16 c.c. of water and add 1 gram of iodine, shaking till dissolved. Make up separately a solution of 25 grams zinc chloride in 12 c.c.'s of water, then mix the two solutions.

J. W. Lewis (Journ. Tex. Inst. 1933. 122T) has described a microscope test for chemically damaged cotton fibers involving the use of sodium zincate. When subjected to this solution normal fibers show a clear sharp outline when viewed under the microscope, whereas damaged fibers swell and tend to dissolve so that the edges cannot be clearly seen.

Interesting deductions as to the storage which sized cotton goods have undergone are now possible as the result fo Geake's researches. (Journ. Text. Inst. 1932, 279T.) The extraction of cotton fabrics with acid and subsequent analysis for metals revealed the fact that in newly woven cloth zinc chloride was found exclusively in the warp, but that after storage under moist conditions, the zinc salt migrated to the weft. A chemical study of the distribution of zinc, then, leads to information as to the conditions and length of time of storing. In this paper, new and old methods of determining metals are compared.

Copper has previously been considered unique in its ability to combine with ammonia and produce a complex substance which dissolves cellulose. Recent work by Tocco and Debendette (1933) indicates that this is not so; by a process of cementation they have succeeded in replacing the copper in the cuprammonium solution of cellulose by zinc and also by cadmium. The substitution is slow and the more cellulose held in solution, the slower it is. The zinc amine was about equal in viscosity to the copper amine of same concentration. They were unable to prepare zinc and cadmium solutions of cellulose directly, however.

The universal distribution of zinc in nature is rather a surprising fact if one has been used to regarding the metal as confined to industry and manufacture. According to Giaya it occurs in the body tissues to the extent of 0.0009 per cent in the case of a child, increasing with age to 0.005 per cent in the case of an old man. The rise in concentration is due to gradual absorption of the metal from foodstuffs.

Zinc plays some part in the normal metabolism of animals and plants, because without it, certain plants, for example corn, become chlorotic. Animals fed on a diet

entirely free from the metal do not thrive. It is found relatively abundantly in such foods as yolk of egg and milk, but food prepared in zinc vessels takes up a little in the process. There is a case on record up a fruit preserve which, on analysis, contained nearly 4 per cent of zinc sulfate.

Zinc oxide is used medicinally for preparing ointments and lotions to be applied locally. The oxide has antiseptic properties and although it is neutral to the skin tissue, acid-producing microbes turn it into compounds of definte bactericidal power. Zinc ointment is valuable in a dyehouse where vitriol is used and where there is consequent risk of burns.

● GENERAL RELEASES

The General Dyestuff Corp. announces the following releases:

Indanthrene Olive T Powder Fine For Dyeing—a new representative of the Indanthrene range. It is said to be best dyed by the IN process and is claimed to produce on cotton, linen and other vegetable fibers, olive shades of remarkable all around fastness properties. It is said to be superior in fastness to light, weather and washing than the Indanthrene Olive RAP.

Diazo Sky Blue 3 G L A—A new diazo color, which when dyed in the usual way for direct dyestuffs from a salt or Glauber's salt bath, and diazotized and developed with Beta Naphthol is said to produce at a comparatively low cost a bright greenish blue of good fastness to light and washing which may be discharged to a clean white with Rongalite C. It is also claimed that the fastness to rubbing, ironing and alkali.

Copies of the above may be obtained on request.

● COLOR ANALYZER

The Bausch & Lomb Optical Co. has issued a booklet on a new color analyzer which they have tested in their own Scientific Bureau and which is said to have received high praise at the Department of Agriculture where it was used on a large variety of products. This instrument analyzes color according to its psychological attributes of hue, saturation and brilliance, using the Munsell discs and a prism mounted in the hollow shaft of an A C induction motor of the shaded pole type. It is said that any color may be analyzed,—strong colors, tints, shades, near whites and greys. It is claimed that color matches may be quickly made.

● NEW PATENTS

(*Abstracted by S.O.C.M.A.*)

Manufacture of Viscose. (And more particularly of viscose solutions of reduced viscosity, which comprises alkalizing the cellulose in an aqueous caustic soda solution containing a small quantity of an unpolymerized aliphatic compound with at least 2 hydroxyl groups.) Adolf Kampf and Heinrich Fink, Premnitz, Westhavelland, and Arno Matthes, Milow, Kreis Jerichow, Ger., assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Ger., No. 1,955,239, April 17, 1934.

Process of Treating Cellulose. (Relates generally to an improved process for the treatment of cellulose prior to the esterification of the same and particularly to the treatment of cellulosic material prior to acetylation, and apparatus therefor; a division of application Ser. No. 330,245 filed Jan. 4, 1929.) George Schneider, Montclair, N. J., assignor to Celanese Corp. of America, No. 1,955,836, April 24, 1934.

Process of Producing Sulfonic Acids and Sulfonates. (Of the water soluble type, comprising the treatment of petroleum oil with sulfur dioxide.) Robert T. Osborn, Richmond, and Roderick Craig, Oakland, Calif., assignors to Standard Oil Co. of Calif., San Francisco, Calif., No. 1,955,859, April 24, 1934.

Process of Preparing M-Acylamino-Sulfochlorides of the Benzene Series. (Valuable intermediate products for the manufacture of dyestuffs, synthetic drugs, insecticides, and auxiliary products for dyeing and textile purposes; more specifically, comprises the reaction of chlorosulfonic acid on N-aceto-o-toluidine.) Wilhelm Neelmeier, Leverkusen-I. G. Werk and Wilhelm Lamberz, Leverkusen-Wiesdorf, Ger., assignors to General Aniline Wks., N. Y., N. Y., No. 1,955,887, April 24, 1934.

Hydrogenation Product from 2.2'-Dihydroxy- and 2.2'-Di-o-Acyl-1.1'-Di-Naphthyl. (Valuable dyestuff intermediate products for the preparation of tetrazo dyestuffs.) Karl Zahn and Heinrich Koch, Frankfort-on-the-Main-Hochst, Ger., assignors to General Aniline Wks., Inc., N. Y., N. Y., No. 1,955,998, April 24, 1934.

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Destruction of Organic Dyes By Perchloric Acid

In the Analysis for Lead*

By J. A. KIME and O. L. EVENSON

THE use of perchloric acid as an oxidant for different types of organic matter in analyzing for lead[1] and other elements has been investigated.[2, 3, 4, 5, 6] These applications suggested that perchloric acid might be advantageously employed for the destruction of the permitted food colors in the routine analysis for lead[7] where the procedure using nitric acid is not entirely satisfactory. With certain of the dyes, an undesirable yellow color, which is only destroyed by prolonged heating, results from the use of nitric acid over a normal oxidation period. The nitrosyl sulfuric acid that is formed must be decomposed and the oxides of nitrogen evolved. Furthermore, it was thought that the increased cost of perchloric acid might be offset by a saving of the analyst's time.

Conditions of Digestion in Comparison

(A) Ten cc. of concentrated nitric acid was added to the five grams of dye in a tall form 500 cc. beaker and placed on a hot plate whose temperature was about 150° C. When the charred material was near to dryness, fifteen cc. of sulfuric acid was added, the hot plate temperature raised to about 250° C., a watch glass placed on the beaker, and the remaining organic matter destroyed by small additions of concentrated nitric acid.

(B) Fifteen cc. of concentrated sulfuric acid was added to five grams of dye in a tall form 500 cc. beaker. With the hot plate temperature at about 150° C., not over five cc. of 60 per cent perchloric acid was added. After a rather vigorous initial reaction, the temperature was raised to about 250° C., a watch glass placed on the beaker, and the oxidation completed by adding small portions of the perchloric acid.

In Table I are contained representative values which show the relative effectiveness of the two oxidants. On the average, about 1.8 grams of nitric acid is equivalent to one gram of perchloric acid, a relationship which does not follow from the decomposition equations for the two acids.

TABLE I

Comparison of Perchloric and Nitric Acids as Oxidants for the Destruction of Organic Dyes

Colour Index No.	Dye	Cc. Required for Combustion of 5 grams of dye: Perchloric Acid	Nitric Acid
150	Orange I	15	25
None	Sunset Yellow FCF	12	22
None	Ponceau SX	11	20
184	Amaranth	11	22
10	Naphthol Yellow S	7	12
640	Tartrazine	10	18
80	Ponceau 3R	15	22
1180	Indigotine	10	19
773	Erythrosine	8	16
22	Yellow AB	17	40
61	Yellow OB	23	42
666	Guinea Green B	18	37
670	Light Green SF Yellowish	14	30
None	Fast Green FCF	15	27
None	Brilliant Blue FCF	14	30

The C. P. reagents used were: 60 per cent $HClO_4$, sp. gr. 1.61; 70 per cent HNO_3, sp. gr. 1.42; 95-96 per cent H_2SO_4, sp. gr. 1.84.

The successful application of vanadium and chromium as catalysts for the oxidation of coal has been reported.[6] The oxides of several active catalysts were tried for promoting the reaction between perchloric acid and the decomposed dye material. Vanadium and selenium catalysts speed up the reaction, decrease slightly the amount of acid necessary, and do not interfere with the lead determination. Due to increased reactivity, the perchloric acid must be added in smaller amounts, so that there is little saving in time. The atomic concentration of catalyst per gram of dye was 5×10^{-5}. The amounts taken then with a five-gram charge were: V_2O_5, 23 mg., SeO_2, 28 mg., Cr_2O_3, 21 mg. These catalysts used with nitric acid exhibit no appreciable activity.

*Contribution No. 11 from the Color Certification Laboratory, Food and Drug Administration, U. S. Department of Agriculture, Washington, D. C.

Results

Perchloric acid is especially recommended for the destruction of yellow AB, yellow OB, guinea green B, fast green FCF, light green SF yellowish, and brilliant blue FCF in the analysis of the permitted food dyes for lead. It gives a slightly colored solution with about 50 per cent saving in time. This saving more than compensates for the increased cost, perchloric acid being approximately eight times as costly and twice as effective. Perchloric acid is satisfactory for the destruction of the other food dyes, but offers no distinct advantage over nitric acid, since these dyes are completely decomposed rather readily by the latter and the former has some tendency to foam in the first stages of decomposition.

Literature Cited

[1] Bornand and Dumont, Ann. fals. *26*, 406 (1933).
[2] Kahane, Caoutchouc and Gutta-percha *24*, 13549 (1927).
[3] Kahane and Dumont, Bull. soc. chim. biol. *15*, 1247 (1933).
[4] Kahane and Stefanesco, Bull. soc. chim. biol. *15*, 1239 (1933).
[5] Sarata, Japan J. Med. Sci. II Biochem. *2*, 261 (1933).
[6] Smith and Deem, Ind. Eng. Chem., Anal. Ed. *4*, 227 (1932).
[7] This unpublished method is an alternate for the procedure described in the United States Department of Agriculture Bulletin 1390, Supplement No. 1, page 5.

NEW PATENTS

(Continued from page 478)

Production of Coloring Matters Containing Nitrogen. (For instance, gray to brown to black coloring matters obtainable by treating a polyamino-anthraquinone in a liquid aqueous medium with a gas comprising oxygen under increased pressure and at elevated temperature.) Heinrich Hopff and Robert Schweizer, Ludwigshafen-on-the-Rhine, Ger., assignors to General Aniline Works, Inc., N. Y., N. Y., No. 1,956,030, April 24, 1934.

Process of Sulfonation. (To produce m-benzene-disulfonic acid, comprises reacting upon benzene in succession with sulfuric acid and oleum in the presence of an initial quantity of benzene-disulfonic acid.) Nicolas Benoit Grillet, Neuilly, France, assignor to Societe des Usines Chimiques Rhone-Poulenc, Paris, France, No. 1,956,571, May 1, 1934.

Color Lakes and Process of Preparing the Same. (An improved method for the manufacture of the phosphotungstic and similar basic color lakes of superior fastness.) Carl Immerheiser and Bodo Zschimmer, Ludwigshafen-on-the- Rhine, Ger., assignors to General Aniline Works, Inc., No. 1,956,921, May 1, 1934.

Sulfonated Higher Alcohol Esters of the Higher Fatty Acids and Method of Making the Same. Fritz Dambacher, Chemnitz-Sa., Ger., assignor to E. F. Houghton & Co., Phila., Pa., No. 1,957,324, May 1, 1934.

Anthraquinone Body and Process of Preparing the Same. (Comprises nitrating Bz-1, Bz-1'-dibenzanthronyl in nitrobenzene, forming an amine from the nitro-body, and condensing the amine so formed by the aid of alkaline ring-closing agents; yield gray to black shades on cotton.) Edward T. Howell, Milwaukee, Wis., assignor, by mesne assignments, to E. I. duPont de Nemours & Co., No. 1,957,459 May 8, 1934.

Improved Dibenzanthrone and Process for Its Manufacture. (Particularly, new processes for the preparation of Ponsol Green G.) Ralph Norbert Lulek, Milwaukee, Wis., assignor to E. I. duPont de Nemours & Co., Wilmington, Del., No. 1,957,547, May 8, 1934.

Water-Insoluble Azo Dyestuff and Fiber Dyed Therewith. (For instance, the diazo compound of 1-amino-2-methoxy-5-chlorobenzene combined with 3-hydroxy-1.2-benzofluorenone, for use in preparing fast dyeings and printings on the fiber or for preparing pigments; produced on the fiber yield olive to black dyeings of good fastness.) Arthur Zitscher, Offenbach-on-the-Main, Ger., assignor to General Aniline Works, Inc., N. Y., N. Y., No. 1,957,-572, May 8 1934.

Process of Preparing Azo Dyestuffs Containing Copper. (Dye cotton green shades.) Detlef Delfs and Rudolf Knoche, Leverkusen I. G.-Werk, Ger., assignors to General Aniline Works, Inc., N. Y., N. Y., No. 1,957,580, May 8, 1934.

Manufacture of Phthaloyl-Phenanthridones. (Dye cotton, from an alkaline hydrosulfite vat, yellow shades of good fastness properties.) Rudolf M. Heidenreich and Paul Tust, Leverkusen-on-the-Rhine, Ger., assignors to General Aniline Works, Inc., N. Y., N. Y., No. 1,957,593, May 8, 1934.

Dyestuffs of the Anthraquinone Series and Process of Making Same. (Comprises condensing in an aqueous medium in the presence of an acid binding agent and of a copper compound a 1-amino-4-halogen-anthraquinone-2-sulfonic acid with benzidine; dye wool from an acid bath blue to greenish blue shades.) Georg Kalischer, Frankfort-on-the-Main, and Ernst Honold, Frankfort-on-the-Main-Fechemheim, Ger., assignors to General Aniline Works, Inc., N. Y., N. Y., No. 1,957,599, May 8, 1934.

Anthraquinone Dyestuffs. (For example, comprises heating 1.4-diamino-2.3-dichlor-anthraquinone under atmospheric pressure with neutral sodium sulfite and m-cresol to form the sodium salt of 1.4-diamino-2-cresoxy-anthraquinone-3-sulfonic acid; yield very clear and fast blue-violet dyeings on wool from a faintly acid bath.) Berthold Stein, Mannheim, Ger., assignor to General Aniline Works, Inc., N. Y., N. Y., No. 1,957,858, May 8, 1934.

Selenazolinocarbocyanine Dye and Process of Preparing It. (A new class of dyes, useful for sensitizing photographic emulsions.) Frank L. White, Rochester, N. Y., assignor to Eastman Kodak Co., Rochester, N. Y., No. 1,957,869, May 8, 1934.

Process of Preparing 2-Methyl-Selenazoline. (A division of above patent No. 1,957,869.) Frank L. White, Rochester, N. Y., assignor to Eastman Kodak Co., Rochester, N. Y., No. 1,957,870, May 8 1934.

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Recent Improvements in "Naphtol AS Dyeings"*

By **A. F. WILLIAMS**

THE rapid development in the "Naphtol AS group of dyes" is not entirely due to bringing out new Naphtols, Fast Color Salts and Bases, but also to careful observation and a readiness to admit errors in original recipes with consequent modification of the dyeing processes.

The facts that the dye is formed on the fiber from its components and that these components often vary considerably in chemical constitution cause new points relating to dyeing in bulk to be discovered from time to time. Consequently, there is a rich and promising field of investigation for the "Naphtol AS" dyer, both in the laboratory and in practical production.

It is intended to outline here working methods which have been developed during the last few years for various combinations of Naphtols and Fast Color Salts or Bases.

Perhaps the most important product of recent years is Variamine Blue Salt B. The diazo-compounds of Variamine Blue B, RT, and FG differ fundamentally from other diazo-compounds by their distinctly low coupling energy in presence of a member of the Naphtol AS group. In the case of cost bases for reds, the coupling process is completed in a few seconds, while with the Variamine Blue Salts it only takes place very slowly. The Variamine Blues, therefore, are unsuitable for use in yarn or machine dyeing, or in the dyeing of piece goods on the jigger; in bulk working, such a slowly coupling diazo-compound jeopardizes the levelness of the dyeing very considerably and also its fastness to rubbing. In dyeing piece goods, using the padding mangle, it is only possible to obtain a satisfactory formation of the dye after airing for a considerable time, and in the presence of the weakly acid magnesium sulfate as alkali-binding agent. The low coupling energy and the consequent low production were the causes of the working out of special developing methods to give satisfactory and quicker production of these important blue dyeings.

The "soda-developing" process is known generally; in this the Naphtol impregnated material is passed through a mangle containing an acetic acid solution of diazotized Variamine Blue, and subsequently coupled in a soda ash bath. This method still is used sometimes for producing plain-dyed grounds for discharge work.

It was observed by an English printer that the coupling of Variamine Blue takes place very quickly if the goods, after passing through the developing mangle, are immediately run over hot drying cylinders. This very simple method, which could be used in almost every works, has a serious drawback. Part of the diazo-compound decomposes under the influence of the high temperature and some of it settles on the cylinders which become dirty and cause staining. Wrappers, unfortunately, are not much good for more reasons than one and, if used, get dirty very quickly. In the course of attempts made to overcome these difficulties, the goods were run between heated plates immediately after passing through the developing bath. The increase in temperature obtained in this way is sufficient to accelerate the coupling process quite considerably, but if it is desired to obtain quantitative dyestuff formation, the coupling is best done at a temperture above 100° C. under definitely controlled conditions. Such temperatures are most advantageously reached in a jacketed steamer; the Collor-sine steamer is particularly suited to this developing method. In this steamer, which is heated both indirectly and directly, the dye is formed in an atmosphere of steam at about 110°-115° C., and the coupling under these conditions is complete in a few seconds. This interesting method of development is used now on a large scale in print works and dyehouses. The important factor is the speed at which the plant is to be run; this naturally decides the size of the steamer required. If the goods are to be run at about 30 yards per min., the steamer should have a capacity of about 15 yards.

*Reprinted from Journal Society of Dyers and Colourists.

The temperature inside the steamer preferably should not exceed 120° C., since at higher temperatures a certain amount of decomposition of the diazo-compound occurs. When using this method, care must be taken to avoid the presence of a large excess of diazo-compound as it is not only wasted, but there is a much greater danger of its decomposition products settling on to the fiber. It is advisable, therefore, to reduce the concentration of the developing solution, so that only as much of the diazo-compound is carried away from the bath as is necessary to complete the coupling with the Naphtol on the fiber. It has been calculated that at a developing speed of 30 to 35 yards per min., about 20-30% of the dye is formed during the passage through the developing mangle. If 40 g. Variamine Blue Salt B were required for the production of the dye with the quantity of Naphtol on the goods, the amount required in the starting bath could be cut down to about 30 g. Variamine Blue Salt B, provided that 100% expression takes place at the mangle. The feeding-up liquors are made strong enough to contain the amount of diazo-compound sufficient for coupling. It should always be possible, therefore, to work the feeding-up liquors with the theoretical quantity of diazo-compound required for the formation of the dye. If it is of importance to obtain clear dyeings it is even advisable to work somewhat below the theoretical quantity.

At the high temperature of development, however, a small amount of diazo-compound is decomposed and slightly dulls the dyeing; this cannot be avoided altogether.

Often in practice, only the magnesium sulfate contained in the Variamine Blue Salt B is used as the alkali-binding agent. It is well-known, however, that magnesium sulfate is not an ideal alkali-binding agent, since with caustic soda, magnesium hydroxide is formed and this shows an alkaline reaction. Magnesium sulfate protects the diazo-compound, therefore, at the high temperature involved only to a small extent, and dyeings produced in this way turn out rather dull.

Clearer shades are obtained if sufficient zinc sulfate for binding the alkali is added to the developing bath. This is a very good alkali-binding agent because its hydroxide is neutral.

In this case acetic acid as the alkali-binding agent is out of the question as it reacts much to acid and at the high temperature involved strongly jeopardizes the coupling process.

(*At this stage the Lecturer showed a series of patterns dyed with Variamine Blue B illustrating the effects of various developing methods and alkali-binding agents on the resultant shades.*)

The differences in shade of the patterns exhibited were very considerable and the obvious conclusion is that alterations in the developing process with Variamine Blue Salt B have a very great effect on the finished shade. It is necessary, in order to obtain uniform results, therefore, to adhere as far as possible to the same working conditions for this product.

Equally good results are shown by the new steaming process when Variamine Blue Salt RT is used, but it is not applicable to Variamine Blue Salt FG.

The next step in this work was to determine whether the steaming process is of value with the other Fast Color Salts and Bases. It must be noted first that, as a rule, the other members of this series show a considerably higher speed in coupling which can be achieved without special measures. There are a few combinations, however, in which coupling takes place rather slowly, e.g. Naphtol AS → Fast Blue Salt BB and Naphtol AS–LB → Fast Red Salt RC.

In order to study the influence of steaming at high temperature, these combinations have been developed in accordance with the usual process, including a short airing, as well as by the steaming method. Using Variamine Blue Salt B for comparison as the type of a slowly coupling combination, and Naphtol AS → Fast Red Salt 3GL as the type of a quickly coupling combination, the tests showed that with all combinations, with the exception of Variamine Blue Salt B and RT, no noticeable improvement in the depth of shade is obtained by the steaming process. Therefore, it is not of general interest. Moreover, the tests showed usually a somewhat duller shade by steaming than when produced by the ordinary method. This is due obviously to decomposition of the diazo-compound; the two stages of the process follow one another immediately and before the coupling has had time to take place completely, so that there is some diazo-compound in excess and the dulling effect becomes more pronounced as the excess of diazo-compound increases.

Before leaving this discussion of the dyeing of "Naphtol AS Blues", it is to be recommended that cotton printers and piece dyers who use mangles for impregnating the material with the Naphtol, should have them brought up to date.

It is rather surprising to be told from time to time that "the Oranges, Scarlets, and Reds are satisfactory, but the Blues, Blacks, and Browns do not couple anything like so well".

On investigation, it is usually found that the firm making this complaint is using a "wheezy, old two-bowl mangle" for the impregnation. In any case, a two-bowl mangle is not satisfactory; with the bright shades, the fault of imperfect impregnation is there, but the eye is "blinded" and does not see the faults. If the same Scarlets, etc. were reduced to pink grounds, produced, e.g. from a 1 g. Naphtol per l. impregnating liquor, the imperfect impregnation is immediately seen. When dark shades are required, this imperfection is sometimes very noticeable.

A properly constructed three-bowl mangle, on which the prepared and dried material is given two dips into the bath and two squeezes arranged before a good range

(Continued on page 496)

PROCEEDINGS OF THE
American Association of Textile Chemists and Colorists

August 27, 1934

Officers of National Association

ROBERT E. ROSE, *President*
E. I. Du Pont de Nemours & Co., Wilmington, Del.

A. R. THOMPSON, Jr.—ALEX MORRISON, *Vice-Presidents*

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CARL Z. DRAVES — **WALTER M. SCOTT**

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LOUIS A. OLNEY
Lowell Textile Institute, Lowell, Mass

Council Representatives: Rhode Island—Heyward F. Lawton, New York—Hans Meyer, Philadelphia—Harold B. Dohner, Midwest—Carl E. Bick, South Central—G. H. Dubois.

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Harvie Bruce Kimbrell, Secretary, Dixie Mercerizing Co., Chattanooga, Tenn.

Midwest Section
Eric F. Hempel, Chairman, National Knitting Co., 2165 South First Street, Milwaukee, Wis.
Elmer F. Smith, Secretary, American Aniline Products, Inc., 820 S. Clinton St., Chicago, Ill.

South-Eastern Section
Charles B. Ordway, Chairman, Alabama Polytechnic Institute, Auburn, Ala
C. A. Jones, Secretary, Georgia School of Technology, Atlanta, Ga.

Lowell Textile Institute Student Section
Kenneth E. Leslie, Chairman; Chester M. Kopatch, Secretary

North Carolina State College Student Section
H. S. Bliven, Chairman; D. B. Hardin, Secretary.

Members should notify the **Secretary** immediately of all address changes

MAY MEETING, NEW YORK SECTION

THE May Meeting of the New York Section of the American Association of Textile Chemists and Colorists convened at eight-forty-five o'clock at the Elm Golf Club, Paterson, New Jersey, on Friday, May 25, 1934, Mr. Henry F. Herrmann, Chairman, presiding.

...The routine business was transacted, during the course of which the Nominating Committee reported as follows:

Chairman Herrmann: The only other Committee we have to hear from is that headed by Mr. P. J. Wood—the Nominating Committee. I believe that is the next order of business.

Mr. Wood!

Mr. P. J. Wood: Mr. Chairman, after a very stormy meeting, I take pleasure in presenting the following slate of officers for the coming year:

For Chairman, Ephraim Freedman,
Vice-Chairman, George Baxter,
Treasurer, John Sokolinski,
Secretary, P. J. Kennedy.

and the four Sectional Committee members:

Henry Herrmann,
B. L. Hathorne,
Louis Zisman,
Stewart F. Carter,

and the Councillor from this Section,

Hans Meyer.

(Applause.)

Chairman Herrmann: I don't know whether it is necessary for us, Mr. Wood, to also nominate a member of the Nominating Committee, or whether that is an appointive office.

I have a letter here from the Secretary of the National organization, which says that "To nominate officers for the annual election with full expression of opinion from all members of the Nominating Committee, may require weeks of correspondence. May I, therefore, have from your Section at an early date the name of the member representing it on the Nominating Committee?"

I would rather leave that to you, as to whether you believe that that should be an appointive or an elective position.

Mr. Wood: I think we have done it both ways in the past. I think it is just as well to have the Chairman appoint that man.

Chairman Herrmann: I think we can leave that to the incoming Chairman.

Well, folks, you have heard the recommendation of the Nominating Committee. The floor is open to any nominations that are to be made. Do we have any other nominations for Chairman, for Vice-Chairman, for Treas-

urer, Secretary, or for the Sectional Committee, or Councillor?

Mr. Chase: I move the nominations be closed.

... The motion was duly seconded ...

Chairman Herrmann: All in favor will signify it with the usual sign of "Aye"; contrary-minded.

Since there seems to be no opposition, a motion is in order to instruct the temporary Secretary to cast one ballot unanimously electing the slate as proposed.

... It was so moved and seconded ...

Chairman Herrmann: All in favor say "Aye." It is so ordered.

... The ballot was cast by Acting Secretary Baxter ...

Chairman Herrmann: It gives me great pleasure to turn the office of Chairman over to my successor, Mr. Freedman. (Applause.)

... Mr. Freedman assumed the Chair ...

Mr. Herrmann: Before going, there is just one thing I would like to say about the cooperation I have had from the folks who have helped me here. It isn't a case of sentiment. The job is easy when you have a good many fellows pulling with you, and I feel that a good deal of credit, a certain amount of appreciation, is due to the gentlemen who worked with me, and to the Committees in office. I particularly ask you for a big hand for the Chairman of the Program Committee, without whose assistance I am sure that anybody's tenure of chairmanship would be impossible. Mr. Baxter! (Applause.)

All right, Mr. Freedman. Good luck!

Chairman Freedman: Gentlemen, this high honor comes to me as quite a surprise, and I must say, with mingled feelings of joy and concern. My interests have been bound up with those of the American Association of Textile Chemists and Colorists since my entry into the testing field connected with the retail industry, and in that connection, I have come to know the many problems that beset you, the trials and tribulations that confront you, and the difficulties that many of the technical people in the textile industry are confronted with in their efforts to carry on their work.

I am frank to admit at the present time that when I first entered this particular line of endeavor I was somewhat impatient with the apparent indifference and opinions expressed by many in the textile industry, or shall I say, in the technical end of the textile industry as compared with the views held by the ultimate consumer. I have learned a great deal since then, and I must say that learning as I have, my sympathies are so much intermingled with the activities of all those present that I know of no office that I would rather hold. I know of no activity that I would rather participate in than that of working with you shoulder to shoulder toward the end that we may reap to a greater and fuller degree the fruits of our labors.

For the coming year, I would very much like to plan —and I hope to have the cooperation of all of you— toward the end that when the year is over we can point toward a program that has actually done something for each and every one of us, and by that I mean a program which will consist of projects that will increase our interest in our own line of endeavor and increase our knowledge of the particular problems facing us, to a degree that we can carry on far more successfully than we have in the past.

In closing, I want to say that during the past two years we have been extremely fortunate in having at our helm Mr. Henry Herrmann, who has given us unstintingly of his time and efforts, and under his able guidance and leadership our Section has done marvelously well. I know it will be quite difficult to surpass the achievements of the past two years. I therefore would call for a rising vote of thanks to our past Chairman, and for three cheers for him.

... The members arose and applauded ...

Chairman Freedman: Gentlemen, I am informed that we have a member in our midst who has been very active in the activities of the New York Section, but who for reasons best known to himself and his immediate friends, has decided to become a slacker. It may be that we cannot change his mind. But I think that he still owes something to us. I say that with full knowledge of the fact that we owe a considerable amount to him. Before we allow him to withdraw from our more active circles, I feel it incumbent upon me, and also for the ultimate good of all concerned, to again appoint him Chairman of the Outing Committee. I, therefore, appoint our good, old friend, Mr. Arthur Wiehl, as Chairman of the Outing Committee. (Applause.) The outing is to be held during the month of June.

The notice that all of you received informed you that General William N. Haskell, director of the Institute of Dyers and Printers, and Administrator of the NRA Code for this industry, would appear this evening to talk to you on a subject that was very near and dear to you. Unfortunately, General Haskell has found it impossible to appear, but he has been kind enough to send to us a representative who, as his principal assistant, is very much interested in this particular activity, and who is, I am told, giving all of his time and effort in a very unselfish manner toward developing and carrying on the work that has been delegated to him.

I take great pleasure in introducing to you the speaker of the evening, General William F. Schohl, and I am sure that all of you will find his talk very instructive and illuminating. When he is through, I am quite certain that there will be many questions that you will want to ask him.

I am also of the opinion that our good friend, the General, will very much like to hear at this time the various expressions of opinion as to how the members of this particular Association, representing the technical angle of the printing and dyeing industry, feel toward the activities as they are being carried on, and what in their estimation should be followed in so far as the work of the Code Authorities are concerned. General Schohl! (Applause.)

Code For Dyers and Printers

By **WILLIAM F. SCHOHL**
Institute of Dyers and Printers

MR. CHAIRMAN and Gentlemen: After I get through tonight, you will agree with me that your Chairman of the Program Committee is about worked out, because you will find for your last meeting and before this outing—which will apparently be ably engineered according to the responses that I heard before, when his name was mentioned as Chairman—you have a man to speak to you who is neither a dyer, nor a manufacturer, nor a printer, nor a dyestuff man. I am a lawyer in the state of New York. It may sound rather peculiar to you to know that I am here in New York City on this particular mission. My reasons for being there are not quite as unselfish as the Chairman would lead you to believe.

I want that to go into the record so that the man who makes out the checks every two weeks will not forget to put my name on one of those checks.

You notice that General Haskell tried to send someone over here who also is still connected with the military of the state. I have known him for almost ten years, since he has been commanding the 27th Division. About four years of that time, I commanded the 106th Field Artillery in Buffalo, New York, and for the past five years or thereabouts, I have been commanding the Field Artillery Brigade, which includes all of the artillery in the State of New York. As a matter of fact, it is the largest brigade of field artillery in the United States Army, because other brigades only have three regiments and I have five.

The General would have liked to have been here, but I do know that he has a great many appointments, and usually they are made weeks in advance. On this particular night, he had another engagement, and he asked me to express to you his regrets in being unable to be here and tell you about his experiences as the executive director of this Code for the past four months.

I am a poor substitute for him. I would like to make my speech as short as the report of your last meeting was; your minutes of the last meeting. (Laughter.)

I am also concerned about speaking, because this young lady here, I have been told, is so able, that nothing will miss her attention.

I told your Chairman, who just retired a few moments ago, that I could talk to you about any number of subjects a great deal better than I can about the dyers and printers. I could probably talk field artillery terms from now until tomorrow morning, and thank God for you, I don't have to, or don't get the privilege, because this is to be a short meeting, as I was told by the Chairman. (Laughter.) But as I looked around tonight—your Chairman named every one of you gentlemen to me and said this man represents so and so—and then as I noticed the serenity and calm in this meeting, I was reminded that this was not a meeting of the dyers and printers. (Laughter.)

I participated in a number of those meetings in the past five or six weeks. As a matter of fact, the three or four divisions of the dyers and printers which I attended reminded me of the war over on the Western Front, and here we have a group that apparently—no, not apparently, but that is, happy and contented. Apparently you are all making money. You are not worried about collections, as the dyers and printers are. You are probably worrying about their collections to you. So it is rather a pleasant surprise to come to a meeting of this kind and get away from the cares, the difficulties, and the problems that confront the people with whom you do business.

I knew nothing about the Code for silk and rayon or rayon and silk dyers and printers, or any other Code, except as I had read about the adoption of Codes when the NRA was passed. I know a lot about the statutes in the State of New York. The judges sometimes tell

*Presented at meeting, N. Y. Section, May 25, 1934.

me I don't know enough about them when they reverse me, or give me a wrong decision. (Laughter.) But I do know a little about the interpretation of statutes and the enforcement of statutes, so when General Haskell asked me to come down and assist him for a while, I said I would. Then when he asked me to come over here tonight, I said that I would, although I didn't want to. I told him yesterday, after I saw this beautiful notice, "I think this is your place, you are featured here as the speaker."

He said, "Unfortunately, you will go." (Laughter.) And being in his Division, I am here, because I know General Haskell too well. I obey his orders.

Gentlemen, seriously speaking, I was amazed at what really was the condition in the various industries, beginning, say, from 1929 or 1930, until a year ago. I doubt whether any citizen of this country, except one who is engaged in business, had any idea of how conditions had changed for the worse. In my own business, I knew it was getting harder and harder to collect bills. I could render service, and did render a lot of service, but I was unable to get money.

However, since being down here, getting the story from General Haskell, and looking up some of the records there in the office, I begin to realize why the step was taken at Washington to thrust upon all industries regulation and compliance. In this industry of dyers and printers, about a year and a half ago, they found conditions were so very bad that they attempted to remedy those conditions themselves by the organization of the Institute of Dyers and Printers. Here is a business that runs into millions and millions of dollars, and for reasons undoubtedly which came because of the depression, very few, if any, of those concerned were able to operate except at a loss.

The Code was adopted, the Code selected by representatives from the dyers and printers. It was adopted as a means to help them get out of this situation. You know probably better than I do that the provisions in that Code are varied and multifarious. The Code attempts to set up a minimum wage scale, a maximum number of hours per employee per week, a maximum of machinery hours per week, the abolishment of child labor, and the prohibition against the employment of any person under 18 years of age in an occupation which is hazardous or detrimental to health. Those provisions undoubtedly were incorporated in the Code through the NRA, for the reason that they would assist in bringing more purchasing power by employing more men and getting more money in pocket per man, than was possible before.

Those particular provisions need strict compliance, and in those respects, I think General Haskell agrees and everybody, I think, who has been in contact with those provisions, agrees that they are being enforced, and they can be enforced. I doubt if there are any violations taking place today on any of these points. The Compliance Division over in Paterson, through a series of checking here and there, is quite positive that there are few, if any violations, and those few are unintentional.

But when we go beyond those particular provisions we find there is a great deal of difficulty. The Code also sets up an attempt at price stabilization. It sets up a prohibition against the sale or the rendering of service below cost. It provides for a cost accounting system to be established by the Code Authority. It gives the Code Authority the power and authority to demand or make mandatory for all concerns to adjust their claims through a central adjustment bureau of the Code Authority.

It provides that certain reports shall be furnished by concerns in the industry and that these reports by concerns be tabulated so that the Government may know exactly what the production is from week to week and take steps, if necessary, to curtail that production. It provides that certain information on prices, such as price reporting the confirmation of contracts, be reported to the Code Authority.

Gentlemen, all of these things are, as near as I can see it, things that are exactly contrary to the ideas of business men from the time of the formation of this Government, and as I see it, it took an effort to get the three million concerns in America to surrender their fundamental rights and come in and operate under the provisions of codes, along the same basis and at the same time.

The question of prices in particular was something that had been bothering not only this industry but other industries for years, and especially during the days of the depression. Because of the depression—I will put it that way—prices were tumbling right and left and the converters (there are no converters in this group, I understand) took every advantage of the difficulties which the dyers found themselves in, and as a result, prices went down, so that the dyer and printer said that he was operating at a loss in practically every service he was rendering.

To avoid that, and to bring back, if possible, prices to some stabilized point, the Code provides for price reporting—namely, that every concern must file a list of prices for all the services rendered by that concern, and that list of prices must be filed with the Code Authority or the Institute of Dyers and Printers. Then, no modification of those prices can be made, except on a ten-day notice.

It was undoubtedly the hope of the men who wrote this Code that prices might be kept at a certain stabilized point for ten days at least, so that this continual dropping of prices which not only had its effect on the dyer and printer but on the converter, on the dress goods man and on the retailer, might come to a halt.

Confirmation of prices: This means that if a dyer or printer makes an offer to do a job for a converter, he must file a copy of the contract with the Code Authority, and that contract or order contains a detailed description of the quality of service he is to render, together with the price which he intends to charge. That price cannot be, on the face of it, at least, below the price filed by him with the Code Authority. A great many concerns today feel that that provision in a Code should not be enforced. In other words, a great many concerns feel that the informaiton which they must file with the Code Authority, giving the name of the customer, the quality of service and the price, is of no concern to the Code Authority. They say they should never furnish it.

About the time that I came down, General Haskell was attempting to get the concerns in the industry to file prices that were above cost, which would furnish a little profit to the concern. It couldn't be done as a price fixing proposition, because that is absolutely against the law, against the old anti-trust laws that we have. He tried to do it in a most diplomatic way, by getting the concerns to either file individually or collectively.

I sat with him in a number of these conferences. One of them broke up in a row, absolutely a row. In all my experiences, I can say that I had never met so many individuals and quite a few concerns, who are as fine specimens as we have in the dyeing and printing industry. On the other hand, I have never in my life seen so many who are of the chiseling type.

In some of these conferences you heard the word "chiseling" right and left, one man accusing the other of chiseling on prices, another man calling another one a name that this machine would not take. That is practically the situation in that particular industry, in so far as love for one another is concerned.

When you combine with that the competition that naturally exists in that industry, you can see how difficult it is—although the General didn't realize that at the time when he attempted to have these prices stabilized—for any individual, exercising his authority under the Code, to make 150 firms (there are 150 some-odd concerns in this industry operating under this Code) file a price that is practically the same—seven, eight, nine or ten cents—and then stick to that price openly, honestly, for a period of longer than one hour.

As a matter of fact, I saw in a number of these conferences when a price was to be established effective, we will say, on Monday morning, and the price was going up from eight to ten cents, five or six men would sneak out of the room, go to the telephone, undoubtedly call up their plant, and out would go orders at the old price. They would get all the orders they could and fill their plant up before the price went up to ten cents.

Those that didn't succeed in getting their plant filled in that way, and those who knew all of the chiseling devices and all the arts that go with it—and there are some of those concerns—rebates, discounts and various other allowances, probably hundreds of varieties, would quote the price established at the meeting, and then surreptitiously would go out and hand back this rebate.

Consequently, the ethical firm—like Bob Gaede's, for instance, and I say that advisedly and sincerely—found that someone was getting more than his share of business and getting business away from that ethical firm—doing it only in one way, through this secret, damnable method of giving rebates and allowances, and unjust claims.

Reports were made to the General on that. I think we had about a dozen dye houses reported—I am speaking now of the dyers and printers—who were alleged to have given rebates or discounts to various converters, and they named the converters. The General sent investigators and auditors to those various establishments, and they were unable to discover anything wrong with any of their contracts, with any of their bookkeeping methods.

I heard from someone else, not in the dyeing and printing industry, a man who is in the retail dress goods business, one morning, going down on the bus, he said, "Why, hell, that is easy. I know two or three of my competitors who have a double set of books: one for the Government and one for themselves." It may be that some of these dyers and printers have a double set of books and when the auditors from the Code Authority get there, they never get the right set.

After that experience, the General with his usual firmness, unprejudiced, unbiased and caring not what the result might be as far as he himself was concerned, called us in one morning and said, "I don't believe this ten-day notice is effective. I think it is unfair to the ethical concern. I think it works a hardship both on the big and small concern. It protects no one in the industry who attempts to be honest and above-board and ethical, but it gives the chiseler the opportunity he wants to get in and get business from the man who is honest."

He said, "I would like to take out that ten-day provision. I would like to waive it, to go into effect immediately."

He expected that I, being a lawyer, might find some loophole. Well, we have a good counsel with the Code Authority, a man from Paterson, Judge Evans. So I read the Code, and I saw in Section 3 of Article VII of the Code what apparently gave him the loophole he was looking for to waive that ten-day notice under certain conditions. I spoke to Judge Evans about it on the telephone and he said, "I think it can be done. I think the General is authorized in doing it if he wishes."

He then sat down and dictated a letter to all the concerns, wherein he said, "From now on the ten-day notice

is no longer necessary. Concerns must file prices, but they may be changed at any time by any concern, without the ten-day notice, by filing the price with the Code Authority."

He said in a statement to the Code Authority not very many days ago, that he did not think it was possible for this Code Authority or any Code Authority to fix the costs for any concern, or rather, for all concerns in the industry, for the various services they render.

People had come to him with their books, showing the cost of production of various services, against whom a complaint had been made that their prices were below cost. They had demonstrated to the auditor for the Code Authority and to General Haskell that the price they were quoting was not below cost. He decided, gentlemen, that it is impossible for any Code to fix what is a cost applicable to all concerns in the industry, and you know as well as I do that the sooner that section or provision of the Code is taken out, the better off everyone will be.

It may be possible to determine whether or not a concern is quoting a price below cost for a particular service. That is a very difficult proposition. But that is as far as the Code should go in its effort to fix prices.

He also said, and this, of course is fundamental—he was the first one to come out with this statement, the first one of all the executive directors of any of the Codes—that any effort on the part of the Government or on the part of Codes to fix prices was impractical, that it never could be done, unless the Government took over every industry and ran the industries itself.

He said, "Of course, that is un-American and no concern would ever stand for it."

But I really think that he is absolutely right in that fearless stand he took, and I believe that, when this particular question, which is now being sent out to all concerns in the industry for an expression of opinion, comes back again to the Code Authority, and if the consensus of opinion in the industry is that those sections of the Code shall be eliminated, and is sent down to the National Administrator and the President, they will welcome such a recommendation and such action, because I believe and the General believes that they feel the same as he does—that these sections have no place in a code of any kind.

It is just another attempt—and I don't believe that was in the statute as far as the NRA is concerned—by the group that had beautiful ideas (and we can't blame them for trying it) to make men good by legislation. It is like the other noble experiment which went overboard not very long ago.

It is impossible to say that every individual in our neighborhood will be honest and upright at all times in his conduct with other men. We can't do it by statute. We have statutes which prohibit various things. We have crimes and misdemeanors, and yet you and I know that statutes do not prevent the commission of those crimes and misdemeanors, because our penal institutions are filled with those violators.

The same thing is true with people who are seeking means to prevent war. I think every effort should be made to follow along reasonable lines in that direction, but again I think most of us are of the opinion that as long as there is human nature and as long as human nature is as it is today, war is imminent. As long as human nature is as it is in the industry today—not only the dyers and printers, but in every industry—there will be individuals who, through ruinous methods of competition, can always be depended upon to do the thing which will not only tear down their own house, but the houses of those with whom they come in contact.

The time may come—I don't think it will be in your lifetime or mine—when all individuals will be honest and upright. When that time comes, I think the dyers and printers, the various divisions of dyers and printers, will be able to meet in a serene and calm manner. They will be able to agree on fair prices and file prices and keep those prices at a point where there will be a fair and reasonable profit for the people who operate the plants and those who may have invested their capital in them.

I believe, as General Haskell does, that the various Codes have accomplished results and that they will continue to accomplish results along certain lines of activity. But certain features will be eliminated and it may be that they can be taken over eventually by well-informed trade associations who can establish themselves and may succeed—not through coercion or force, but through reasoning—in getting their associates and their brothers to work in harmony as much as can be done. You have competition among yourselves. You know that there is no such thing as complete harmony in business, but these associations can reduce the friction, they can keep people from doing things that are unethical.

I am sorry General Haskell couldn't get here himself. I know he would have had a much more illuminating message than mine. I am simply trying to express to you in my own poor way what I think he would have said to you in a much better way. Again, I say on his behalf, I extend his regrets, and for myself, I thank you for the privilege of being able to come here and meet you gentlemen who are all technical men. At some time I hope to meet some of you in your plants so you can tell me how some of the colors are made and how they may be used, because I may have to go into the dyeing business myself some day, if this depression doesn't end soon. (Laughter and applause.)

Discussion

Chairman Freedman: Well, gentlemen, from the words of the speaker, General Schohl, we found out that he is an artillery officer. We also ascertained that he is a lawyer. I am given to understand that lawyers have three methods of attack. If they have the facts, they quote them. If they haven' the facts, and know the law, they quote the law. If they have neither the facts nor the law, they just argue. (Laughter.)

Our good friend, the General, had the facts, and it is needless for me to say that he presented them in a very forceful and illuminating manner. Undoubtedly some of you have certain questions that you would like to ask, and I throw the meeting open to discussion.

Mr. C. H. A. Schmitt: Mr. Chairman, I was wondering why General Haskell would have General Schohl on his staff, he being an artillery officer. From all accounts, he spoke about the hectic meetings, and I suppose General Haskell figured that at some time he was going to get a couple of consumers in there and then they would have to call on the artillery. (Laughter.)

General Schohl: Well, I have been through a few artillery attacks and a few gas attacks, but you had the gas attack tonight listening to me. (Laughter.)

Chairman Freedman: Are there any questions? Are there any particular problems that any of you would like to present at this time?

It appears, General, as if—I won't say they have been asphyxiated, but it looks like a case of their being tongue-tied.

General Schohl: I am very thankful. In reading the minutes, or the address by Mr. Price, in your publication, I noticed that there were a number of inquiries made of Mr. Price. He answered them very ably. I am very glad that there are no inquiring members of the dyers and printers here who probably would ask me to interpret certain provisions of the Code.

Chairman Freedman: Well, apparently you have done so nobly and ably in performing your job this evening that you have answered all the questions that those assembled wanted to ask, so that you have actually unloaded their guns for them. (Laughter.)

I will again ask if there are any questions.

Mr. Winn W. Chase: Mr. Chairman, I have one question, and I wonder if the General would like to amplify a bit General Haskell's statement in his memorandum as to why he believes it is impossible to install the uniform system of cost accounting. The direct question I wanted to ask is—this is where the General will have to argue—What, in his opinion, will be the result of eliminating these provisions from the Code?

General Schohl: With regard to establishing a cost accounting system, there are 150 some-odd concerns, with various degrees of overhead. Some concerns have, say, three men, who are really devoting all of their time to the operation of the plant. There are other concerns that are smaller than that, where there is no overhead as far as large or small salaried help is concerned, especially at the top.

They render something like—I think this is about right—17,000 different kinds of services in the industry. It may be that one plant is rendering one hundred items of service. It may be rendering a thousand items of different kinds of service.

The General does not believe that any method of cost accounting can be devised or installed, fixing a cost for any particular service which is a true cost for all the concerns in the industry. In other words, that particular section purports to set up in the Code Authority, power to fix the cost, for instance, on French crepes and to apply it to all concerns. It may be that one concern is doing only that particular type of service, and may be running 75 or 80 per cent of production hours. On the other hand, another concern may be rendering that service plus a hundred others, and running only 50 per cent of production hours.

The cost that applies to the one will not apply to the other. So why attempt to set up machinery which will be, in the final analysis, imperfect and unfair in so far as various concerns are concerned?

I don't know if that is clear enough, but that is as near as I can give you his reasons.

With regard to the other question that you asked—

Mr. Chase: I was wondering what your opinion was as to the result of eliminating this first provision from the Code, that is, the—

General Schohl: The ten-day notice?

Mr. Chase: Yes.

General Schohl: I won't speak for the General on that. I don't believe he has expressed himself, but I will give you my reaction.

Since the ten-day notice has been removed from the Code—not from the Code but from operation; it is still in the Code—there has been a fluctuation of prices. There is no question about that. Prices have gone down. But it gives the ethical concern the opportunity to go out in the market and meet market conditions against the unethical concern. There has been no great amount of unfavorable reaction to that form concerns in the industry.

It is my belief that after a short experience with that condition, when the unethical concerns realize that they have no more advantage over the ethical concern, they may feel more inclined to quote a price that is fair and equitable and hold to that price without the chiseling.

That still remains to be seen. But it is giving everybody an equal opportunity, big and small. It is putting them all on par. No one has an advantage, and they did have an advantage under the ten-day notice.

I know in the particular instance of Bob Gaede's concern, he allowed a differential on a particular service and he suffered as a result of going on that price, to the extent that he practically had no business in his plant on that service, while other concerns, not nearly as large, had a great amount of that particular service in their plants.

At the time the decision was made, the General had no idea of considering whether it was Bob Gaede or whether it was any other concern, big or small. The only thought he had in mind was, Why keep this provision, which has worked out in such an unsatisfactory way? Let's get rid of it and confine our activities to enforcing the labor provisions, to collect, evaluate and disseminate the various reports that come in, to see what prices are filed and that when filed, they remain in effect, or rather, that no concern shall quote below those prices filed by them, and then to enforce the provision that all claims which are allowed or adjusted by concerns shall be reported to the Central Adjustment Bureau.

Gentlemen, there is one angle right there where one can detect, at least, who the chiseling converter is and who the chiseling dyer is. You would be amazed at some of the items that come in. Right on the face of these reports, you find an allowance of one cent per yard to meet market conditions—cutting their filed price by one or two cents. Those cases are being considered by the General. It may be that they will be reported as violators. It depends on what Judge Evans has to say as the legal adviser for the Code Authority.

Price filing and price reporting is the information which all concerns in the industry want and they can get it.

Mr. Schmitt: I just wanted to ask you this, General: For instance on these prices, do I understand that General Haskell, looking at this matter from the standpoint of the consumer—say, for example, they want to have the prices uniform, is that to establish the price, the highest price of production? Say that one plant may have a lot of sons-in-law and grandsons-in-law and everything in on the overhead. It certainly doesn't seem right that a smaller plant, which is more efficiently run, and which can produce the material at a profit at eight cents a point should have the same price as the other company which, with all its tremendous overhead, would lose money, say, at ten cents a pound. What would the General want to do, establish the price at ten cents? After all, the consumer has some rights left in America.

General Schohl: That is exactly why he is against the provision in the Code on cost accounting, establishing a cost accounting system. He says it cannot be done, for the very reason that you mention.

There are two different prices there undoubtedly, and you are getting back again to your old problem of competition, the efficient firm against the inefficient firm. He thinks that the efficient firm should not be penalized in favor of the inefficient firm.

In these conferences, he took no part in attempting to say what the price shall be. He left it to the judgment of the dyers and printers to establish a price amongst themselves if they could, which would be, in their opinion, cost plus a fair profit. Any attempt to fix prices, of course, higher than that would be a hardship against the consumer, and would undoubtedly be mentioned in Mr. Darrow's report. (Laughter.)

Mr. P. J. Wood: It seems to be a battle between the in-laws and the outlaws.

General Schohl: Very good. I will have to remember that. (Laughter.)

Mr. Cohen: General, I would like to ask a question. You made a statement that if the Government took over industry, it would be un-American. I want to say that after all then, our post office and our building homes down in the Tennessee Valley is un-American.

General Schohl: Well, that is a broad statement.

Mr. Cohen: Furthermore, I would like to know how this Code was drawn up. I understand that there is a group of large silk manufacturers on the Code Authority and that the smaller manufacturers have no voice in it at all.

General Schohl: You mean the small dyers?

Mr. Cohen: Yes.

General Schohl: I think that is a mistake.

Mr. Cohen: I dont' know anything about it at all.

General Schohl: As a matter of fact, there will be an election on the 18th of June, and I know there are amongst the nominees large and small and medium-sized dyers. The representation at the voting, or for voting purposes, makes it possible for all of the small dyers to get together, and throw out any of the big dyers they don't want as trustees and elect trustees from small dye concerns, because no concern may have more than 100 votes, regardless of the payroll figures. If the payroll figures were used, some concerns would have close to 200 votes. But that was the idea in limiting it to 100 as a maximum.

Mr. George L. Baxter: General, if this question of costs were simply one of efficiency or inefficiency, it would be very simple. Unfortunately, it is not that. Just as one bad apple will spoil a barrel, so one low price makes the market. The average low price which has been made in the market is usually made not by someone with a low cost, but by someone who has no idea of his costs, someone who goes out in a helter-skelter way and says, "Well, here is a big competitor doing this for three cents. I will take it for two, because if he can do it for three, I don't know my costs, but I can take it for two and get out." After six months, or after two months, he may decide he is losing money and quit, but in the meantime your whole

market has been dragged down to a point where everybody is taking the work at that two cent price.

If you eliminate all provision for cost accounting, you are going to have most of your prices made by your people who have no system whatsoever, and you are going tc have them all at a very low level.

General Schohl: I didn't make that statement. I said the provision on cost accounting will be submitted to the industry for elimination, but that the provision in the Code which says that no price shall be filed below cost will still be retained, and it is an easier matter and probably a surer matter to determine whether or not eight cents, for instance, is cost or below, or above, for a particular service for a particular concern.

The power is still with the Code Authority to determine whether or not John Jones, for instance, has filed a price for a service which is below cost, and in doing that, it may be that his cost or his price filed is above cost and yet is way below what John Smith is filing.

Chairman Freedman: Are there any further questions or comments?

General, on behalf of the New York Section of the American Association of Textile Chemists and Colorists, I want to thank you for your kindness in coming here this evening, and for the highly interesting talk that you gave us. I admit that I was in error, that all the guns were not unloaded. (Laughter.)

General Schohl: I notice the heavy artillery came in on me with the long-range guns. (Laughter.)

Chairman Freedman: I find that we still have a hangover from the previous administration, that one of the committees that was appointed by the outgoing Chairman will not function for some time, and just how well it has functioned in the past will not be known for some time to come. So in the interests of economy, I am about to dismiss it. In doing so, however, I dismiss it with a vote of thanks on the part of the incoming officers, or those who have just been elected. I refer to the Nominating Committee, of which Mr. P. J. Wood is chairman. I want to thank you on behalf of the present administration for your kind and helpful work, and I trust that your choice of officers will not be far wrong.

Mr. Herrmann, the past chairman, made mention of a communication received from the parent association, the last paragraph of which reads as follows: "To nominate officers for the annual election with full expression of opinion from all members of the Nominating Committee, may require weeks of correspondence. May I, therefore, have from your Section at an early date the name of the member representing it on the Nominating Committee?"

As Chairman of the New York Chapter, I nominate Mr. P. J. Wood to act as the representative of the New York Section on the Nominating Committee.

I would also like to call attention to the fact that there are a number of men who were members in good standing of the Association, and who for economical reasons had to drop out. One case came to my attention some time ago when a man informed me that he sent $5 to someone so as to become a member in good standing. All it requires to become reinstated is to address a letter to the secretary of the National Association, Mr. H. C. Chapin, Lowell Textile Institute, Lowell, Massachusetts, enclosing $7.50—$2.50 is for reinstatement and $5 for the current dues.

That is all that is necessary to reinstate and place in good standing any former member. There are undoubtedly quite a number of men who dropped out two or three years ago and who would like to become active again. So if any of you know of them, please acquaint them with the facts as I have presented them to you, and tell them that we here are only too glad to again welcome them to our midst.

Is there any further business to come before the meeting? Is there any new business?

... There was discussion as to the date of the outing and it was voted that it be held on the last Friday in June ...

Chairman Freedman: There being no further business, I call this meeting adjourned.

... The meeting thereupon adjourned at ten-fifteen o'clock P. M. ...

Proceedings of the American Association of Textile Chemists and Colorists

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward to the secretary a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the secretary any vacancies which may occur in their businesses.—H. C. Chapin, Secretary, Lowell Textile Institute, Lowell, Mass.

Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive

Note. Persons who have obtained employment should notify the secretary at once. Prospective employers may file vacancies either with the secretary or the American Dyestuff Reporter.

A-2

Education—B.T.C., Lowell Textile Institute, 1932; also course in typing.

Experience—None to date, interested in quantitative analysis, experimental dyeing, color matching, dye testing and dye identification. Ability to learn quickly and will go anywhere. 23 years old, woman, single.

A-5

Education—B.T.C., Lowell Textile Institute.

Experience—Assistant chemist in carpet mill, dye tester in dye plant, research and analytical work in silk dyeing and finishing plant laboratory, plant chemist and overseer of bleaching in surgical dressing plant, assistant chemist in woolen mill. Age 29. Married.

A-6

Education—Analytical chemistry and dyeing course at Lowell Evening Textile School.

Experience—Three years as print chemist and one year as dye chemist for large print works. Two and one-half years as plant chemist for dyeing, bleaching, printing and finishing plant.

A-B-2

Education—Lowell Evening Textile School, 1917.

Experience—Five years' experience in hosiery dyeing, full fashioned hosiery of silk and cotton and silk, also men's hosiery containing rayon, wool, cotton and celanese. Several years experience in laboratory work. Has also had experience in jig-dyeing of cotton piece goods, slub and top dyeing.

A-B-C-1

Education—Graduate Industrial Chemical Engineer, Pratt Institute—1911.

Experience—One year as plant control chemist, 4 years as laboratory chemist with gas company, 13 years as plant chemist with bleaching, dyeing and finishing plant. (Rayon and cotton piece goods). Formulated processes and put them into plant operation, 1 year as chemist and demonstrator for dyestuff company, 1 year as superintendent colorist with print works printing linen and rayon, 1 year as director of testing laboratory for national dry goods concern.

A-E-2

Education—B.T.C., Lowell Textile Institute, 1933.

Experience—Assistant instructor in chemistry, Lowell Textile Institute. Member of scholastic honorary fraternity.

A-E-1

Education—Ph.D., Univ. of Illinois, studied chemical engineering at Columbia, licensed chemical engineer, New Jersey.

Experience—10 years' experience teaching in colleges, subjects included chemical and textile subjects. Has had broad experience in industrial work including experience in testing materials, research and consulting. Will go anywhere; references.

B-1

Education—Educated and trained in chemistry and calico printing in Glasgow, Scotland.

Experience—Has been with large print works as colorist for 13 years producing first class work on cotton, rayon, wool and silk fabrics. References.

B-2

Experience—Boss dyer with one firm for 18 years, divisional supt. at print works for 1 year, in charge of processing and dyeing of cottons and rayons at large bleachery for 6 years. Prefers bleachery in East but will go anywhere. References.

B-3

Experience—Foreman piece dyer for the past 21 years. Can dye the following; celanese, rayon, cotton lacks, wool, silk and mixed fabrics. Has knowledge of finishing and laboratory work.

B-6

Education—Graduate R. I. School of Design.

Experience—5 years in bleachery, 7½ years as assistant dyer, 2 years as boss dyer and 3 years as superintendent of dyeing and finishing. Married, 33 years old. References.

B-7

Experience—Eight years as boss dyer on skeins and ribbons. Over ten years as chemist and head dyer for a large hosiery mill. Experienced on Silk, cotton, rayon and wool in skeins, ribbons, piece goods and all kinds of mixtures. Willing to go anywhere. Not afraid to work or face responsibility. Can handle help efficiently.

B-8

Education—Chemistry and Dyeing Department, Philadelphia Textile School.

Experience—Eleven years experience as chemist and boss dyer on the following: woolen, worsted and cotton yarn; woolen, worsted and union piece dyes on both ladies' and men's wear; wool, cotton, shoddy and mohair raw stock. Age 33, married, will go anywhere. References.

B-9

Experience—Hosiery dyer with fifteen years' experience on high grade silk hosiery; familiar with all types of machines. Age 43, married. Will go anywhere.

B-12

Education—2 years days at N. Y. U. and 3 years nights studying chemical engineering.

Experience—1½ years asst. colorist, 5½ years colorist. Experienced on vats, commercial and fast colors on cotton and cotton-rayon mixtures. References; age 29; married.

B-13

Experience—Large experience as an assistant colorist chemist in silk printing, dyeing and finishing; also on cotton and wool dyeing. References.

B-14

Education—Rhode Island School of Design.

Experience—Familiar with all classes of wool dyeing. Seven years with large carpet mill as dyer and processor of washed oriental rugs. Will go anywhere, married, 37 years old. References.

B-15

Education—B.T.C., Lowell Textile Institute, 1934.

Experience—Experience in dye house running washers, dye kettles and as a dye weighter.

F-1

Education—Textile Institute, Alexander Hamilton Inst., Extension work at Brown Univ., working knowledge of German.

Experience—Has had executive departmental work with all types of textiles manufacturers. Acquainted with all types of textile machinery, dyestuff application, laboratory practice, cost methods, and checking methods and processes. References.

STANDARD SILK SAMPLES

There have been prepared, under the direction of the Sub-Committee on Fastness of Dyed Silk, standard dyed silk fabrics to represent four classes of fastness to washing—namely, Class I, Class II, Class III and Class IV. These standards have been carefully dyed with the dyestuffs and according to the dyeing methods recommended in the 1931 Year Book.

The A. A. T. C. C. is prepared to furnish sets of these washing standards for a nominal charge which will cover the cost of preparation. It will be possible to accurately grade the fastness by comparing it with the standards after subjection to the standard washing tests approved by this Association. All inquiries concerning these Silk Washing Standards may be addressed to the Chairman of the Research Committee.

Louis A. Olney,
Lowell Textile Institute,
Lowell, Massachusetts.

AMERICAN
DYESTUFF
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- **YEAR BOOK**

1933 Year Book
of the
American Association
of
Textile Chemists and Colorists

Copies of the 1933 Year Book of the A.A.T.C.C. will be off the press on August 27th and should be in the mails not later than August 31st. We have received many requests for this book not only from the United States, but many foreign countries as well. We take this method of informing those who have placed orders for this important book, just when they can expect to receive their copies.

For those who may not be familiar with its contents we are publishing the following—Index By Subject which we know will be of great practical interest to everyone concerned with the wet processing of textiles.

Index by Subject

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Wool, Fastness Tests for Dyed

Recent Improvements in Naphtol AS Dyeings

(Continued from page 482)

of drying cylinders, will give perfect impregnations running at almost any speed required. In one works hundreds of pieces of 4-oz. cloth are impregnated perfectly on such a range at a speed of approximately 70 yards per min.; heavier goods, of course, have to be run a trifle more slowly, the capacity of the drying range being the governing factor.

It is recommended also that impregnations by this method should be carried out with a nearly boiling Naphtol solution; there is, of course, always the exception to any general rule and one of the new Naphtols, viz. Naphtol AS-L4G, should be used at about 50° C.

Another part of the "Naphtol AS dyeing process", which often does not receive sufficient consideration, but which is of vital importance for the best fastness and shade, is the after-treatment of the dyeing.

It is known that, in the use of most "Naphtol AS dyeings", the ultimate shade is only obtained by proper after-treatment and that this ultimate shade has the best fastness properties.

The investigations of Löchner (*Melliand Textilber.*, 1926, *7*, 243), Kayser (*ibid.*, 437), Ruperti (*ibid.*, 1927, *8*, 942), and Bean and Rowe (this *Jour.*, 1929, *45*, 67), show that after-treatment in boiling soap baths causes the finely-divided pigment in the cotton fiber to coagulate to coarser aggregates; in fact, the coloring matter forms minute crystals. This alteration in the physical structure of the coloring matter is the cause, first of all, of the alteration in shade; further, it brings about an improvement in the fastness of the dyeing as the coarser dye particles formed in the fiber are more resistant to the detrimental influence of sunlight and also chemical bleaching agents. The desired alteration of shade cannot be obtained, however, with all the various combinations under the same conditions. Some combinations only require a soaping treatment at about 70° C., while others require temperatures near 100° C. Certain combinations have even to be after-treated for some time at a boiling temperature in order to obtain the best results, and such conditions cannot be observed easily in bulk working. A few examples will serve to show how the difficulty can be overcome in practice.

It is well-known that Variamine Blue B dyeings alter in shade in boiling soap from a darker to a purer blue. In conjunction with this change of shade, a noticeable improvement in fastness to light occurs. Thus, while the dyeing before after-treatment, on exposure, fades comparatively quickly to a reddish-blue-grey, the properly after-treated dyeing only slowly alters in shade, and fades like Indigo to a greenish-blue.

It is known also that an after-treatment of Variamine Blue B dyeings in an open-width soaping machine is, in general, insufficient to develop the correct shade. It was important, therefore, to find a suitable method which was adaptable to continuous methods of working. Variamine Blue dyeing is done nowadays on such a large scale that any interruption of the contiuous process would curtail production seriously.

It has been found that the change in shade, and consequent improvement in fastness to light, can be obtained if the dyeing, after the diazo-solution has been completely rinsed out, is first passed through a concentrated soda ash solution (about 30–50 g. per l.) and then through the special high temperature steamer. It is sufficient to steam for about 2 mins. at 120° C.; the steamer previously described for developing this combination is also suitable for this after-treatment.

It would be an advantage, of course, to a works dyeing a great deal of Variamine Blue to have two steamers available, one for coupling and the other for the after-treatment of the dyeing.

This method of after-treatment is applicable also to the piece dyeing of many other combinations, e.g, orange shades with Fast Orange GC Salt or Base, violet shades with Fast Voilet Salt B, and blue dyeings with Fast Blue BB and RR Salts and Bases. Certain combinations are not completely developed by this steaming method, e.g. dyeings from—Naphtol AS-BG → Fast Scarlet Salt GG, Naphtol AS-LB → Fast Red Salt RC, and Naphtol AS-ITR → Fast Red ITR Base. Such dyeings need an after-treatment at b.p. of more than ½ hr. They are best after-treated, therefore, in the winch or, if the fastness to boiling will permit, in an open kier. In yarn dyeing, the temperature reached in the dye-beck is not high enough to produce the change of shade with some combinations. When the wet yarn is put into the boiling bath, the temperature will drop considerably and the effect on the coloring matter is then small.

A combination which, in the beginning, gave difficulties in this respect was Naphtol AS-ITR → Fast Red Salt ITR. In the case of this important red combination it has been found satisfactory to after-treat the dyed yarn

in an open kier. The yarn is packed into the kier as usual and a boiling soap solution circulated for from ½ to 1 hr. without pressure; hot and cold rinsings complete the treatment. This method of working has been found to be so convenient in certain works that it is used nowadays for other fast-to-boiling-caustic soda combinations, e.g. Naphtol AS-TR → Fast Red Salt TR. In order to obtain the change of shade with Naphtol AS-ITR → Fast Red ITR Base when dyed upon beams or cheeses, it is advisable to work as follows—A strong soap bath is circulated, drawn-off and, without rinsing, steam is blown through the material for 10–15 mins.

Yellow shades from Naphtols AS-LG, and AS-L3G, and the combination Naphtol AS-L4G → Fast Red KB Base, are in a special class as regards after-treatment.

In the case of these yellow combinations, further coupling of excess diazo-compound takes place in the developing bath. This aditional coupling shows itself very noticeably as reddish streaks on the clear greenish-yellow dyeings. It is particularly pronounced if the coupling takes place in a neutral or even weakly alkaline bath, or if the developing bath is too concentrated; while the actual yellow dyeings have an excellent fastness to boiling, these reddish streaks are not very fast to boiling and can be destroyed if boiling is prolonged, but quicker results are obtained by adding a reducing agent, e.g., Blankit I or Hydrosulfite, to the after-treatment baths.

An important problem in "Naphtol AS dyeing" is the fastness of the shades to rubbing. Considerable progress has been made in this respect during the last few years, so that today the problem can be considered to have been solved, at any rate in principle.

It is known that the fastness to rubbing of these dyeings depends partly upon the substantivity of the Naphtol. Good substantivity alone, however, does not make it possible to obtain perfect fastness to rubbing on account of the peculiarities of the dyeing process. It is well-known also that by hydro-extracting after impregnating, intermediate drying, and/or in some cases rinsing with an alkaline salt solution and after-treatment with soap, preferably a mechanical after-treatment, do improve fastness to rubbing. In spite of this knowledge, it has not been possible in all cases to obtain the desired fastness to rubbing. Newer methods have been found lately.

The Turkey Red oil used previously in the impregnating bath gave considerable trouble; in hard water, e.g., it not only caused a cloudiness, but sometimes a precipitate, and led also to the formation of combinations with the alkali-binding agents of the developing baths which were difficult to remove and so unfavorably affected the fastness to rubbing of the dyeings. These difficulties can be overcome now by the aid of modern auxiliaries, e.g., Eunaphtol AS, Humectol C, and Laventine HW.

These products are stable to lime, metallic salts and acids. It is impossible, therefore, for them to form undesirable precipitates during the dyeing processes in either the impregnating or developing baths, and the pure dye can settle down in the fiber. With this assistance, the foundation of a good fastness to rubbing is laid already in the impregnation bath. A new principle is the use of a protective colloid in the solution of the diazo-compound.

Although the favorable influence of some protective colloids, e.g. Dekol or Prestabit Oil V, on the fastness to rubbing of the dyeings has been known for a long time, this knowledge could not be put to practical use, because these compounds had either a decomposing action on the diazo-compound or led to the production of precipitates in the developing bath.

The product Diazopon A, however, does not possess these drawbacks, while its highly protective colloidal properties help to improve the fastness to rubbing in a two-fold way. In the first place, it keeps in solution the decomposition products formed in the developing bath so that "tarry" matter is not formed, and smearing of the dyed yarn is, in consequence, impossible. Furthermore, Diazopon A keeps the coloring matter formed in the dyebath from the Nahptol adhering mechanically to the fiber, in such a fine state of division that it is transformed into a colloidal solution. On account of this property, there is no longer a "filtering on" of unfixed coloring matter when working with Diazopon A in the developing bath; this is synonymous with a considerable improvement in the fastness to rubbing of the dyeing. Diazopon A is particularly suitable for those dyeing methods in which the developing bath has to be circulated through the material by means of pumps.

Further progress was made towards obtaining a fast-to-rubbing "Naphtol AS dyeing" when it was observed that concentrated soap solutions were able to dissolve or emulsify the loosely-fixed coloring matter; while soap baths of 2 to 3 g. per l. have generally no dissolving effect on the coloring matter, the dye quickly changes to a colloidal solution in a boiling soap bath of approximately 8 g. per l. It is possible in this way to eliminate from all forms of dyed materials dye which is unfixed or loosely attached to the fiber; such a soaping operation is applicable to beck, machine or piece dyeings with equal success. It should be mentioned particularly that this concentrated soaping method has been proved to be a great success in the after-treatment of "Naphtol AS dyed" cheeses and beams, and also has been applied to raw material and sliver.

There has been, hitherto, considerable objection to the soaping of sliver; experiment has shown that this soaping method is successful, owing to the excellent property of Igepon T in removing the soap completely from the soap-treated material.

With regard to the working of a concentrated soap bath for the after-treatment of "Naphtol AS dyeings", a further new discovery should be noted. It has been found that hot rinsing bath, used in between a cold rinsing bath and a boiling soap bath, has an unfavorable effect on the

fastness to rubbing. Apparently, the hot rinsing is the cause of a coagulation of the coloring matter particles, which are not so easily emulsified in the subsequent boiling soap liquor as is the finely divided coloring matter formed in the fiber from the developing bath.

(*Various types of dyeings, e.g., cheeses, loose cotton, cops, cloth, etc. were exhibited to demonstrate the high degree of fastness to rubbing obtainable now with these dyes. A number of the dyeings had been produced from Naphtols of low substantivity.*)

It is worth mentioning here that not very long ago a Manchester merchant after taking delivery of several hundred pieces of "Naphtol AS dyed" goods, wrote to the dyer, to the effect that "he was not previously aware that it was possible to obtain such fast shades on cotton".

The more important factors which influence the fastness to rubbing may be summarized as follows—(1) The use of wetting-out agents which are fast to lime and metallic salts in solution, and to the acids of the developing baths. (2) Thorough hydro-extraction of the impregnated material and, in the case of piece goods, intermediate drying. (3) The use of Diazopon A in the developing bath. (4) After-treatment in a concentrated soap bath.

In connection with the third point, an obvious question arises, viz. when Diazopon A is used, how is the dye precipitated on the fiber?

It might be expected that the dye formed on the fiber in the presence of Diazopon A would be precipitated in such a finely dispersed form that the fastness to washing of the dyeing would suffer. In actual fact, however, the dye seems to precipitate on the fiber in larger particles than when coupling without the use of Diazopon A. In support of this assumption it is found that the dye yields a shade which is intermediate between a dyeing developed as was usual before the introduction of Diazopon A and not soaped, and that of a dyeing after-treatment in a boiling-hot soap bath.

It is known now that the hot after-treatment causes the coloring matter to coagulate to larger aggregates and it can be concluded, therefore, from the observation described above that a dyeing produced with the aid of Diazopon A does possess coarser dye particles. A further proof of the correctness of this assumption is given by exposure to light. If two dyeings, one of which has been developed with, and the other without, Diazopon A and only rinsed in cold water, are exposed alongside each other, it is found that an improved fastness to light is shown by the dyeing produced with Diazopon A.

The investigations already quoted (*loc cit.*) have shown that an improvement in fastness to light of the insoluble azoic dyes is due to an aggregation of the dye particles in the fiber.

Further work with Diazopon A in the developing bath has shown that the coloring matter passes more easily into the colloidal form in a weakly alkaline or neutral developing bath than in weakly acid baths, and also that the colloidal solution of the dye is more stable in the first method. To make use of this observation in practice, it is advisable to couple with diazo-solutions which have been neutralized with excess sodium bicarbonate. The Naphtolate on the fiber, owing to the reaction of the bicarbonate, is in no danger of being destroyed too quickly and, even in dilute liquors, it is possible to obtain a complete coupling. This enables the dyer to reduce the concentration of the developing baths considerably.

The concentrations of many Fast Color Bases can be reduced so far that, in the developing bath, only that amount of Base, which from the published tables is necessary completely to couple with the Naphtol on the fiber, is used. In other words, only so much Base is used in the first bath as hitherto was required for "feeding up" when working continuously. This saving of Base has made it possible to replace working in a running bath by developing in a fresh bath for each lot. The innovation makes the dyeing of small batches considerably more economical; the large amounts of Base required for the first bath by the usual process (sometimes 2 to 3 times as much as is required theoretically) caused the dyeing of one or two lots to be rather expensive.

When working in a running bath, the dye dissolved by Diazopon A accumulates in the liquor and, of course, the baths show a progressively deeper coloration. If used several times, the colloidal solution becomes over-saturated and the otherwise favorable influence of Diazopon A is lost. It is advantageous, therefore, to work in fresh baths from this point of view.

A few Fast Color Bases which yield diazo-compounds of great sensitivity to alkali, cannot be coupled by this method, designated "the neutral method". Such products have to be applied in weakly acetic acid baths in accordance with the usual method; they are the diazo-compounds of Fast Red 3GL Base, Fast Red ITR Base, and Fast Red Salt AL. In order to use the neutral method safely in machine dyeing, it is advisable to neutralize the alkali carried into the almost neutral developing baths by the impregnated material. A special process has been brought out for this purpose; it is carried out as follows —A further quantity of sodium bicarbonate is added to the neutralized developing bath, which is then charged with ammonium chloride and formaldehyde. The reaction between the caustic soda carried into the bath and ammonium chloride develops free ammonia which combines with the formaldehyde to form hexamethylenetetramine: $4NH_4Cl+6H\text{-}CHO+4NaOH=N_4(CH_2)_6+4NaCl+10H_2O$.

Naturally, apart from this reaction, other troublesome reactions might occur. In prolonged storing, a reaction between the formaldehyde and ammonium chloride leads to the formation of hexamethylenetetramine; at the same time, hydrochloric acid is liberated. The presence of this hydrochloric acid in the developing bath jeopardizes the formation of the dye.

Hexamethylenetetramine in conjunction with some Bases, e.g., Fast Orange GR Base and Fast Red B Base in concentrated solutions, may form diazoamino-compounds. This would not only lower the concentration, but would also give rise to heavy precipitates in the developing bath.

In order to prevent these undesirable reactions, the additions of ammonium chloride and formaldehyde are only made shortly before the developing bath is to be used.

This new method has proved to be an excellent one in cheese and beam dyeing. Possibly it may be of importance in chain-warp dyeing, especially for slowly coupling combinations, e.g. the blue dyeings from Fast Blue BB and RR Bases, and the brown dyeings from Naphtol AS-LB with Fast Scarlet TR and Fast Red TR and RC Bases.

The author desires to acknowledge the help of his colleague W. Christ, and the staff of the Dyeing Department at Leverkusen, in the preparation of this paper and particularly for their willing assistance in preparing, on full-scale machinery, the numerous patterns exhibited.

NEW PATENTS

(Continued from page 480)

Vat Dyestuffs of the Dibenzopyrenequinone Series. (Comprises acting on 3.4.8.9-dibenzopyrene-5.10-quinone in a sulfuric acid medium with an iodinating agent in the presence of a halogen transferring catalyst; dye cotton clear fast yellow to yellowish red shades.) Max Albert Kunz, Mannheim, Georg Kranzlein, Frankfort-Hochst-on-the-Main, Karl Koeberle, Ludwigshafen-on-the-Rhine, Martin Corell, Frankfort-Hochst-on-the-Main, Erich Berthold, Ludwigshafen-on-the-Rhine, and Heinrich Vollmann, Frankfort-Hochst-on-the-Main, Ger., assignors to General Aniline Works, Inc., N. Y., N. Y., No. 1,957,892, May 8, 1934.

Water-Insoluble Colored Products Fast to Light, to Water, and to Weather. (Obtained, for instance, from the mono-azo-dyestuff from diazotized 1.8-amino-naphthol-3.6-disulfonic acid and 1-methoxy-2-amino-4-methylbenzene; particularly valuable, among other purposes, for making stone pavings of red or green fast color, colored gravel surfaces, colored brickwork, and for building purposes generally.) Rudolf Winkler, Basel, Switzerland, assignor to the firm Society of Chemical Industry in Basle, Basel, Switzerland, No. 1,958,327, May 8, 1934.

Azo Dyestuffs. (For use in coloring varnish lacquers, oil varnishes and for the preparation of intaglio printing inks, the dyeings possessing yellow to orange shades; for example, the condensation product derived from acetone and ortho-anisidine are tetrazotized and coupled with para-cresol in alkaline solution.) Hans Krzikalla, Ludwigshafen-on-the-Rhine, and Alfred Kirsch, Mannheim, Ger., assignors to General Aniline Works, Inc., N. Y., N. Y., No. 1,958,758, May 15, 1934.

Diaminotriarylmethane Dyes. (For example, comprises condensing benzal-dehyde-2.5-disulfonic acid in the presence of dilute sulfuric acid with 2-mono-n-prophylamino-1-methylbenzene; dye wool blue tints of good equalizing property and fast to alkali; a continuation in part of copending application Ser. No. 267,130, filed April 3, 1928.) Otto Boger, Dessau in Anhalt, and Oswald Meissner, Uerdingen-on-the-Rhine, Ger., assignors to General Aniline Works, Inc., N. Y., N. Y., No. 1,959,455, May 22, 1934.

Symmetrically Substituted Azobenzene Compounds. (Prepared by reducing in an alkaline aqueous medium a 1-nitro-4-halogenbenzene-3-sulfonic- or -carboxylic acid to the corresponding 4.4'-dihalogenazobenzene-3.3'-disulfonic- or -carboxylic acid; for use as dyestuffs or intermediate products for azodyestuffs.) Detlef Delfs, Leverkusen-I. G. Werk, Ger., assignor to General Aniline Works, Inc., N. Y., N. Y., No. 1,959,461, May 22, 1934.

Indigoid Dyestuffs. (Prepared from 4-methyl-5-halogenhydroxy-thionaphthenes; dye cotton bluish red tint of good fastness properties.) Erwin Hoffa and Hans Heyna, Hochst-on-the-Main, Ger., assignors to General Aniline Works, N. Y., N. Y., No. 1,959,474, May 22, 1934.

Ortho-Hydroxyazo-Dyestuffs Containing Chromium and Process of Making Same. (For example, 4-chloro-2-amino-1-phenol-5-sulfonic acid is diazotized and coupled with 1-(3'-sulfo-) phenyl-3-methyl-5-pyrazolone in an alkaline solution and refluxed with a chromium sulfate solution; dye wool very even yellowish red shades of good fastness to light and to fulling). Fritz Straub and Willi Widmer, Basel, Switzerland, assignors to Society of Chemical Industry in Basle, Basel, Switzerland, No. 1,959,507, May 22, 1934.

Vat Dyestuff of the Dibenzopyrenequinone Series. (For instance, tetrachloro-3.4.8.9-dibenzopyrene-5.10-quinone, dyeing cotton yellowish shades of a greenish tinge fast to light and boiling with solutions of soap and soda; a division of copending application Ser. No. 355,654, filed April 16, 1929.) Max Albert Kunz, Mannheim, Georg Kranzlein, Frankfort-Hochst-on-the-Main, Karl Koeberle, Ludwigshafen - on - the - Rhine, Martin Corell, Frankfort-Hochst-on-the-Main, Erich Berthold, Ludwigshafen-on-the-Rhine, and Heinrich Vollmann, Frankfort-Hochst-on-the-Main, Ger., assignors to General Aniline Works, Inc., N. Y., N. Y., No. 1,959,679, May 22, 1934.

Diazo Dyestuffs. (Insoluble in water, obtained by coupling a tetrazotized aromatic diamine with a 3-alkyl-5-pyrazolone, not substituted in the 1-position, the components used being free from free sulfonic and carboxylic acid groups; suitable for coloring plastic masses usually greenish-yellow to bluish-red shades and can be used with good effect for coloring rubber and substances containing the same.) Georg Niemann, Ludwigshafen-on-the-Rhine, Ger., assignor to General Aniline Works, Inc., N. Y., N. Y., No. 1,959,733, May 22, 1934.

Technical Notes From Foreign Sources

Treatment of Animal Fibers

G. Choisy—TIBA 9, 721 (1931)—*A digest of French Patent No.* 704,423 *I. G. Farben-Ind. A.-G.*).—The treatment of animal fibers, particularly wool, for the purpose of improvement of "feel" and external aspect, as well as of increase in weight, has been known and practiced for a good while. Such substances as sodium sulfate, urea, and naturally available substances of the nature of starch, Iceland moss, etc., have been employed for such a purpose. As is evident from the characteristic properties of these substances, they all suffer from the inconvenience of being undesirably extractible upon later contact with water—soluble themselves with ease, and so easily employed in an impregnating bath, they are as easily eliminated on aftertreatment in aqueuos baths, or by accidental wetting or deliberate washing, as they possess no affinity worth mentioning for the fiber; and so the desirable properties of the treated fiber are lost again.

The patent here under review attains a reasonably permanent enrichment of the fiber, particularly wool, by subjecting it to the action of certain halogenated substances, of such a nature as not to alter the material in foundamental points. The amount of such substance employed (at least 10% on the weight of the goods) depends upon the amount of enrichment of quality desired, and of the affinity of the substance to be used for the fiber, naturally varying more or less with the nature of the substance); but the precise amount of the substance to be used can be easily determined previously by experiment on the small scale.

The substances so employed are in general halogenated organic acids, or at least halogenated substances of chemically acid nature, of high molecular weight, such as are found by experiment to possess affinity for the fiber (not all substances of the sort mentioned do possess such affinity); either posssessing free acid groups, or these in the form of salts. In general, the resistance of the charge imparted to removal by washing depends upon the molecular weight of the substance employed; the higher the molecular weight, the more resistant the charge toward removal by washing. The substances are applied in a warm or hot bath, by padding, foularding, or printing, and fixed finally by steaming; or simply applied to the whole lot of goods by boiling in a bath containing the substance, and then washing. The process may be used alone, or, for example, where the substances are free acids by nature, by addition to the hot dyebath, the two processes, of finishing and of dyeing, going on simultaneously. The latter method is particularly advantageous, when the fiber is to be dyed, because of the fact that dyestuffs of desired tone, but ordinarily difficult to dye level on wool when used alone, show a greater tendency to dye level when applied in a mixed bath of the nature mentioned. Or, if desired, the goods can be first dyed, and the substance under consideration then added to the partially or wholly exhausted bath, and the finishing thus accomplished without the need of a new bath being made up. The process is applicable to wool in any condition, from tops to piece and length dyeing.

In this way, lightweight, flimsy weaves, of poor feel, fullness, draping quality, etc., can be transformed into fabrics of qualities as desirable as the former qualities were poor; and such finished weaves, besides commanding a higher price, do not, upon washing, lose the new qualities, or, at the most, do so to an inconsiderable degree.

Example 1: 100 kilos of wool tops are treated for one hour in a bath containing 50 kilos of 2-3-6-trichloranilinesulfonic acid, and 10% of sulfuric acid of 66° B. (this strength is the one referred to in the following examples also), then thoroughly rinsed. The weight of the goods is increased 10%, the wool acquires a smooth feel, and on washing loses only a very small fraction of the increase in weight. If the trichloraniline-sulfonic acid is employed in the form of acylated derivatives, e.g., benzoylated, the finish is even more resistant to washing.

Example 2: 100 kilos of wool are boiled for one hour in a bath containing 50 kilos of 2-4-dichlorbenzoyl-1-8-amino-naphthol-4-6-disulfonic acid (benzoylated on the amino or the hydroxyl group?) and 5% of sulfuric acid. Increase in weight about 20%, feel of goods improved.

Example 3: 50 kilos of woolen piece-goods are treated at 90°-95° C. for 1½ hours, with mechanical agitation, in a bath containing 10 kilos of trichlornaphthalene-sulfonic acid, and 5% of sulfonic acid. The goods are thoroughly rinsed once, and dried. Results about as before, the goods draping with considerable improvement.

Example 4: 50 kilos of a lightweight woolen weave are boiled for one hour in a bath containing 10 kilos of the condensation-product from 2-4-dichlor-phenol and benzaldehyde-o-sulfonic acid, 10% of Glauber salt, 5% of acetic acid, and 3% of sulfuric acid. Gain in weight, 17.5%; quality of goods considerably improved.

Example 5: 5 kilos of woolen yarn are treated at 80°-100° C. (time not mentioned) in a bath containing 50% of the condensation-product mentioned in Example 4, 10% of Glauber salt, 5% of acetic acid, and 10% of sulfuric acid. Increase in weight, 35.5%. Feel of goods greatly improved, the finish permanent toward water.

Example 6: A piece of woolen goods 60 m. in length, and weighing 12 kilos, is dyed in a bath, mechanically agitated, of 600 kilos of water containing 96 g. of Cyan-

anthrol R, 24 g. of Sorbine Red BB, 14 g. of Azoflavine RS, 1,200 g. of calcined Glauber salt, and 500 g. of acetic acid of 6° B. The goods are entered at 50° C., the bath raised to the boil during one-half hour, 500 g. of sulfuric acid are added, the boiling continued for three-quarters of an hour (thus far is plain dyeing), then are added 6 kilos of the condensation-product from sulfonated phenol and chlorbenzyl chloride, the boiling then continued for one-half hour (impregnation process). The goods are not only dyed, but the weight of the goods increases 23%, fullness is much increased, and a heavier body imparted.

Example 7: 30 kilos of woolen yarn are boiled for one hour in a bath containing 15 kilos of tetrachlorphthalic acid. Feel of goods noticeably better, gain in weight 23%. If the bath contains also 3 kilos of sulfuric acid, the gain in weight amounts to 29%.

Example 8: 50 kilos of wool tops are dyed in a machine, in a bath containing 5 kilos of Sulfocyanine Black "", 5 kilos of sulfuric acid, and 25 kilos of tetrachlorphthalic acid. The goods are entered at 50° C., raised gradually to the boil, and boiling continued for 1½ hours. A gain of 12 kilos in weight is attained, the wool being dyed a deep, full black, and gaining desirable fullness.

Example 9: Carpet yarn is boiled for one hour in a bath containing 30% of tetrachlorphthalic acid and 10% formic acid. The weight of the goods is increased 16%, the yarn being softer and fuller as well.

Example 10: A weave of chlored wool is printed with a paste containing 300 parts of the condensation-product from sulfonated phenol and chlorbenzyl chloride, 100 parts of paste made up from British gum, 30 parts of oxalic acid, and 570 parts of water. The goods become softer and fuller. Patterns may also be printed in this way.

Example 11: 10 kilos of woolen goods in piece are treated at the boil in a bath containing 2 kilos of the sodium salt of a chlorinated stearic acid, containing about 50% of chlorine; during the treatment about 1 kilo of ammonium acetate being added, little by little. The greater part of the acid is taken up by the fiber, imparting a better body to it. Other highly chlorinated fatty acids can also be used, for example, the chlorination-products of the fatty acids from fish-oils, oleic acid, the acids from soja oil, ricinoleic acid, etc. Such acids may also have been sulfonated in addition. Likewise, chlorinated or chlorinated and sulfonated paraffine oils may be used similarly.

Example 12: Woolen piece-goods are boiled for one hour in a bath containing 0.5% of Cyananthrol R, 10% of acetic acid of 6° B., and 10% of the condensation-product from 2-4-dichlorphenol and benzaldehyde-o-sulfonic acid. The dyeing is very level, a condition which cannot be brought about by acetic acid alone; and the usual improvement in feel and body is also brought about.

Example 13: A fine woolen weave is dyed between 80° and 90° C., in a bath containing 10% of Anthraquinone Green GXN, 10% of the sodium salt of tetrachlorphthalic acid, and 3% of formic acid of 100%. Advantages those cited in Example 12.

Vat Dyestuff (Bluish Green)

German Patent No. 466,990 (15/X/'28) (*addition to G. P. No.* 398,485 *of* 22/XI/'22)—*I. G. Farben-Ind. A.-G.*—French patent No. 543,910 descibes the production of a bluish-green dyestuff by the reaction of ethyl sulfate upon oxidized dibenzanthrone. If in this process p-toluene-sulfonic ethyl ester is employed as the ethylating agent instead of the ethyl sulfate, a bluish-green dyestuff is obtained, quite different from the one described in the French patent cited. (German Patent No. 398,485). In the present case, the process is modified in details, to cover the use of ethyl sulfate, in organic solvents or suspension-media, which do not contain nitro-groups, but do contain substituted halogen. Also, the process may be carried out in the present of media which do contain nitro-groups, in this case the product requiring to be separated from a blue-violet product also formed, the desired bluish-green product being much more soluble in nitrobenzene or trichlorbenzene. Two examples are given.

Natural Silk Weighting

German Patent No. 468,017 (5/XI/'28) — *Dr. Rene Clavel in Basel.*—The present method consists essentially in weighting the silk in one mixed bath, instead of by successive impregnations with the separate weighting agents.

Briefly, the stannic chloride and the salts usually employed for precipitation, as alkali phosphates, are mixed in a single bath, with the addition of sufficient acids or acid salts to prevent the precipitation of the bath contents. The silk, after passing through this bath, may be passed directly, without previous washing, neutralization, etc., into the usual after-bath of water-glass, aluminum sulfate, etc. If desired, the goods may then be passed into an alkaline bath of ammonium carbonate, or into an alkaline bath containing suitable dyestuffs plus tannin. The second claim specified covers the use of a weighting bath containing metallic salts and free phosphoric acid (which should under ordinary conditions not throw down a precipitate). The third claim specifies the addition of a protective colloid to such a bath, or the treatment of the silk with a protective colloid before entering it into such a bath. The fourth claim alters the details of the first three specifications, by proposing a very much mixed bath, containing, in brief, all the salts, etc., already mentioned previously, in the same bath, so that only one treatment would be needed for the whole process of weighting.

In the process of silk-weighting as usually carried out, the silk passes from one bath to another, requiring to be squeezed, washed, soured off, or neutralized, between each bath; a sequence which makes the ordinary method tedious and costly. The present method reduces the other-

wise necessary amount of equipment, space, time, water consumption, etc., very considerably.

A further advantage of the process is the fact that in piece-weighting the goods can be passed through the machine full width, one at a time or several superimposed upon each other, thus avoiding danger of pressure upon the folded or wrinkled fabric, and of deposition of precipitated material in spots or flakes, which often causes serious trouble. Two detailed examples are given.

Artificial Silk Weighting

German Patent No. 468,018 (5/XI/'28) — *Dr. Rene Clavel in Basel.*—Very much like the preceding patent for natural silk (G. P. No. 468,017).

The first bath, containing the metallic salt, especially stannic chloride, contains acids or acid salts in addition. The goods, after impregnation in this bath, are passed directly (not washed, but perhaps squeezed) into the second bath, the precipitating bath; and, if desired, after squeezing, then passed into a third bath of a suitable alkali, which may also contain tannin. The second claim specifies the addition of a protective colloid to the first bath, or impregnation with a protective colloid previous to entering into the weighting bath. The third claim specifies the use of a single mixed bath, containing all of the salts, etc., already mentioned, as in the preceding patent for natural silk.

A CORRECTION

In the article, "Notes on the Colorimetric Determination of pH of Surface Active Solutions of Textile Assistants" published in the July 30th issue it was referred to in error, as a contribution from the textile laboratory of E. I. du Pont de Nemours & Co. instead of the technical laboratory as it should have read.

U. S. CIVIL SERVICE EXAMINATIONS

The United States Civil Service Commission announces the following-named open competitive examinations:

ASSOCIATE COTTON TECHNOLOGIST
ASSISTANT COTTON TECHNOLOGIST

Applications for the positions of Associate Cotton Technologist and Assistant Cotton Technologist, Bureau of Agricultural Economics, Department of Agriculture, must be on file with the U. S. Civil Service Commission at Washington, D. C., not later than September 20, 1934.

The entrance salaries range from $2,600 to $3,800 a year, subject to a deduction of not to exceed 5 percent during the fiscal year ending June 30, 1935, as a measure of economy, and also to a deduction of 3½ percent toward a retirement annuity.

Optional branches are (1) Yarn and fabric manufacture, and (2) fiber technology.

Competitors will not be required to report for a written examination, but will be rated on their education and experience and on a thesis or published writings.

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office in any city which has a post office of the first or the second class, or from the U. S. Civil Service Commission, Washington, D. C.

GENERAL RELEASES

Palatine Fast Orange RN a new brand of the Palatine Fast color series brought out by the I.G., and offered to the trade by General Dyestuff Corporation. Dyed from a strong sulphuric acid bath it produces red orange shades of very good fastness to light, and good fastness to washing, water, salt-water and perspiration; it even stands a light fulling. It is very level dyeing and especially recommended as a shading color for combination shades. It has good affinity for silk and is very suitable for direct printing on wool and silk; it gives a clear white discharge with Rongalite CW.

This organization is also bringing out a new product of their Palatine Fast range—PALATINE FAST BROWN GRN which possesses very good fastness properties.

AIR MINDED

Ernst C. T. Bick, well known manufacturer of Chemical Specialties and Dyestuffs, has qualified for a pilot's license and now visits important textile cities in his beautiful custom-built auto-gyro.

As Mr. Bick is located in Reading, Pennsylvania where all of the products of Bick and Company are manufactured exclusively, he must make frequent visits to his customers and sales staff. He explained that with the congested condition of the roads his ship was not only a pleasurable means of transportation but a practical way to save valuable time and travel annoyance.

His ship is equipped with all of the latest devices for safety and its interior was indeed comfortable to your correspondent who visited Mr. Bick by the antiquated method of travel-by-rail.

No! We did not fly, but we did bid good-by to Mr. Bick as he left for an important conference in Newark and learned that he would be in that city about the time we were pulling through Philadelphia on our trip home.

More power to air minded executives in the chemical and dyestuff industry.

OPEN FORUM

Rules under which this department of the REPORTER is conducted are as follows:

1. Anyone who has a technical problem on which he would like advice may submit it to the Reporter and it will be published in the first available issue.

2. Any reader who feels that he has a solution of the problem may forward his reply to us and if we feel that the reply is suitable it will be published in a succeeding issue.

3. For each such reply published the Reporter will pay a minimum of $2.

4. In case there is more than one answer to the same question, the one covering the subject in the most complete and authentic manner will be published, or if two answers are sufficiently different both will be published. If two answers are considered equally good, the one first received will be given priority.

5. The Reporter will assume no responsibility whatsoever for the accuracy of the answers submitted—it is simply offering a vehicle for the public expression of its readers' opinions.

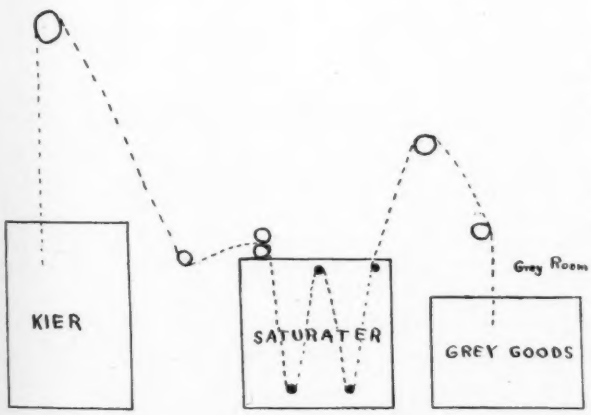
6. Both the questioner and answerer must send in his complete name and address. When requested we will publish only the initials or other identifying insignia.

Answers

10—We have a particularly difficult problem in holding our bleachery on a set shade or white, due partially to the standard getting soiled from handling as well as from yellowing with age.

We would like some information as to how other bleacheries hold their standard shades of white.—**M. P. C.**

Answer No. 2. The goods should be pulled from the grey room through a saturator vat which is 4 to 5 feet deep with two small wooden rolls on top and bottom of vat. The liquor (soda ash and water) are luke warm and 4 points on the twaddle. For high grade broadcloth, pique and heavy ducks or drills it should be five points and for low count goods and cheap goods should be 3. The goods should be run right into the kier. The caustic soda charge will depend on the water and how the kier acts. Sometimes a kier will siphon in water from the boilers and water



your kiers and water. For the low counts with the twaddle at 3, test the liquor cold, but when charging the kiers have water boiling hot. In this method the boil is two hours quicker. The same method can be used on the better class goods. Boil 8 to 10 hours. Chemic at 1 twaddle. Divide the contents in the steam reduces the charge. You must know of the kier in chemic bins. Pick up and run through washer and then through white sours (1½ Twaddle) to washer to white bins. A good washing in kiers will help goods to whiten quicker. Kier pockets can be avoided to a great extent by not tramping goods. Some bleacheries use the automatic, in which case the liquor should have ½ point soda ash. This method saves running through hot water. Let lay overnight, pick up, wash and run into kiers. Your bleaching costs will be reduced and you will get a standard white that will not yellow. In finishing you blue to your standard.—H. F. C.

15—I would like to know of an immunizing process for spun silk that will withstand chrome and after-chrome dyeing. The tannic acid and tin crystals methods do not stand up well enough. I would appreciate also the cost per pound of this treatment.—**S. C. H.**

Answer: Perhaps a zinc resist would be suitable for the spun silk. This is made as follows: Equal parts of zinc sulfate and extra finely ground China clay are pasted together with a little water until all lumps are dispersed. This paste is then boiled up with a thickening consisting of equal parts of animal glue and gum senegal, until the mixture assumes the consistency of thin syrup. The goods are padded in this, dried, then entered into the dyebath. Should the resist break down during vigorous boiling of the bath, the next batch of resist preparation should be thickened with the glue and China clay alone. The cost of this resist will be less than tannin and tin resists.

—S. Wadebridge.

16—Where the dyer has some cotton and some rayon knit goods fabric to process on wooden jigs, is it best to use certain tubs for cotton and certain tubs for rayon? Why?

What should be added to remove graphite knitting marks from cotton knit goods in a scour-bleach containing peroxide and soda ash?—**A. Z.**

Answer: (A) If the rayon is of the viscose or copper silk varieties, the same tubs as are used for dyeing cotton fabrics may not always serve because these rayons, behaving much like cotton, with the same classes of dyes, may cause unwanted staining by residual dye in the wooden jig rollers, etc. Where cellulose acetate rayon is concerned, little trouble through staining by residual color will be encountered when using the same jigs as are employed for cotton goods because the general run of cotton dyestuffs do not dye acetate rayon. At the same time, it would be unwise to permit acetate rayon goods to follow heavy colors which have been obtained by use of substantive dyes, for in this event slight staining might occur where the apparatus had not been cleaned before using again. In the case of substantive black, the stain on the acetate rayon is pale gold.

(B) We suggest a partial hand cleansing of the worst stains with benzene, carbon tetrachloride, or trichlorethylene before the goods enter the scour-bleach. Alternatively, querist might add a proportion of sulfated castor oil soap, or a little pine oil, to the usual scour-bleach bath. A suitable sulfated castor oil soap can be obtained from most firms specializing in solvents.—S. Wadebridge.

CLASSIFIED

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

POSITION WANTED as dyer, application chemist, technical demonstrator salesman, or laboratory supervisor. Ten years' experience as dyer of worsted and woolen yarns and pieces; cotton raw stock, yarns and pieces; rayon yarns and pieces; and hosiery and union fabrics. Four years' experience in laboratory of dyestuff manufacturer doing standardizing, demonstrating and application research. Looking for position offering adequate compensation and future advancement possibilities. Will go anywhere. Single. Age 35. Write Box No. 823, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

EXPERT DYER with 5 years or more practical experience in dyeing cotton yarn piece goods. Location, South America. Must have good knowledge of Spanish language. Single man preferred, about 30 to 40 years of age. Give full particulars about your training, experience, etc. Write Box No. 824, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

A SALES EXECUTIVE who has had successful selling experience in textile processing materials for cotton, wool, rayon and silk, will find it profitable to communicate with a nationally known manufacturer of such products. Applications must be in writing, giving complete sales experience, training, age, and references. All letters will be held in strictest confidence. Our organization is fully acquainted with this advertisement. Write Box No. 828, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

YOUNG MAN, age 24, college education, laboratory and practical experience dyeing wool and other fibers, seeks position. Well recommended. Write Box No. 825, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSTION WANTED—Mill chemist with twelve years experience, including several years practical experience in bleaching, dyeing and finishing of cotton, rayon wool and mixtures—knit and woven goods—wishes to change from present connection. Capable of working out economical processes, etc. Experienced in application of all classes of colors. Write Box No. 829, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED—Dyer 27, knowledge and experience in dyeing and bleaching straws, hosiery and rayon piece goods dyeing for 10 years. For 8 years in own dyeing business. Very proficient color matcher. Desires connection preferably with mill or dyestuff laboratory. Write Box No. 830, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED—Dyer rayon cotton fabrics, right man has bright future. Prospect as associate small metropolitan plant. Must detail experience, age, minimum salary. Write Box No. 831, American Dyestuff Reporter, 440 4th Ave., New York, N. Y.

POSITION WANTED—By Philadelphia Textile graduate 31 years old, married, protestant. Experience—At present and for past 6 years, boss dyer in large plant using wool, cotton, rayon and acetate fibers; 2 years apprentice learning wet and dry finishing; 1 year apprentice at wool sorting,—also summer work in dyestuff laboratory. Would like position with opportunity for advancement. Write Box No. 832, merican Dyestuff Reporter 440 Fourth Ave., New York, N. Y.